FEBRUARY 1954

# American Engineer

**National Engineers' Week**
**FEBRUARY 21-27**
**1954**

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# Letters

### *On Executives . . .*

Dear Editor:

The letter of F. C. Tromell of Schenectady, "Errand Boy Trend" in the AMERICAN ENGINEER for December, 1953, brought up recollections of my encounters with the idea that engineers do not make successful executives—also let me add, or successful contractors. . . .

Graduated from Delaware College, Class of '87, I soon learned the lowly monetary consideration for engineering services.

Contractors' foremen were paid $100 per month; superintendents were paid $200 to $300 per month. The resident engineer's salary was $125 per month; chief of party $75; instrument man $60; rodman $45.

At that time contractors would not employ engineers in any capacity. The widely adopted theory was engineers did not make good foremen or successful contractors—engineers were too well educated, not tough enough, not practical, paid too much attention to the specifications, also did too conscientious work.

My first employment by a contractor came about when I was working on a B & O Railroad job summer months as a rodman at $45 per month. It was a rock cut job, and the powder man, now known as the blaster, was paid $125 per month, and was off the job. A large blast was waiting to be loaded and continuous work depended on this blast for without it the work would shut down. The contractor, a man of great energy, profanity and drive, could not load the blast. I met him in the morning on the right-of-way raving, stamping on his hat, and making the air blue with oaths and imprecations. Learning what the trouble was I volunteered to load and shoot the holes. His reply was, "What does an engineer know about handling powder?" The result was he hired me for that blast with dire threats if it failed. The resident engineer gave me permission to be off for that day. The blast was a success and I was paid $5. After considerable argument there and then I was employed as powder man at $125 per month.

From that time on my work was mostly with contractors, with my engineering education submerged for a while. I had some splendid and varied experiences in which my engineering education was valuable to my employers and to myself.

In 1901 I applied at the office of H. S. Kerbaugh, Inc., of Philadelphia, Pa. Kerbaugh had large contracts from the Pennsylvania Railroad on the main line from Philadelphia to Columbus, Ohio, and from Philadelphia to New York.

It was my intention to contact Mr. Kerbaugh personally. The first man encountered was his partner, Frank Brown, Secretary and Treasurer (himself an engineering graduate of Princeton). There was a young man ahead of me, he gave Mr. Brown his name, said he was an engineer. Brown in no uncertain language turned him down stating, "We do not employ engineers, the Pennsylvania Railroad does all the engineering necessary."

Then my turn came. Brown said, "I suppose you are aonther one of those engineers?" My reply was, "I am a practical man and I wish to see Mr. Kerbaugh." "You cannot see him; he is too busy." I said, "I will wait until he can see me." "No use; didn't I just tell you you cannot see him?" Then a voice called out from an inside office. "If the young man wishes to see me send him in." In this way I met the president and principal owner of the business. Mr. Kerbaugh was an able, energetic, successful engineer and contractor, an organizer and executive.

At that time he was the largest contractor in the United States, in capital, plant, employees, in important contracts involving large quantities of materials and money value. He questioned me on my experience then asked who in Philadelphia knew me. I gave him the name of Mr. George Rice, Chief Engineer of the Reading Railroad, and Consultant to the Baltimore and Ohio. Under Mr. Rice's jurisdiction I had had charge of extensive railroad construction and tunnel work in Maryland.

Mr. Kerbaugh told me to see him the following week, which I did, and I was employed for the next twelve years in charge of his most important work.

In 1939 the University of Delaware conferred on me the Degree of Master of Engineering. Spearson and Son of London and New York employed me for four years as their Engineer and Construction Manager.

During World War II, I was commissioned and served as Major of Engineers, U. S. Army. I organized and directed the Federal Works Progress Administration in charge of sewer construction, water supply and sanitation in Brooklyn from 1933 to 1943. At one time there were 125 jobs under way, over 5,000 men and much equipment employed, with the responsibility of spending $500,000 per month.

This letter is not intended as boasting or self-glorification, but to show that a man with an engineering education, some ability as a leader, with experience in good management, can become a successful executive.

An engineering education fits a man for any type of business enterprise. The measure of success is up to the individual.

W. B. GRAY, P. E.
Brooklyn, N. Y.

### *Doan Story . . .*

Dear Editor:

The article by Dr. Leland Doan in your December issue, "Business Leadership — a Positive Responsibility," was confounding. Perhaps Dr. Doan the salesman, not Dr. Doan the engineer, was speaking. The salesman builds up your ego and promises you great things—if and when. The engineer promises you nothing; he presents the facts, accurately and truthfully, and lets them speak for themselves.

To a follower of Aristotle the title was redundant. Leadership is a privilege. Where there is a privilege there is a responsibility.

(*Continued on page 5*)

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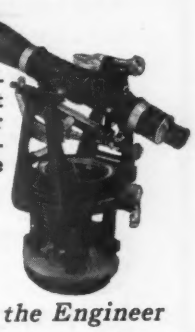

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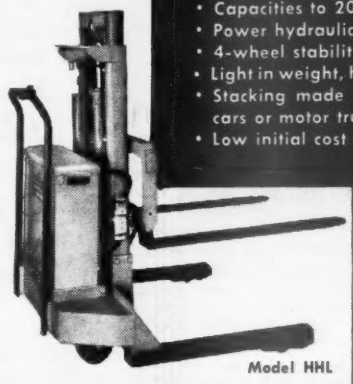

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FEBRUARY, 1954



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***The responsibilities of our engineers become greater with the passage of each day, and each day we see new evidence of their success in meeting the tremendous challenge of our age.***

—President Dwight D. Eisenhower

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## Letters

(*Continued from page 3*)

To a student of economics business does not rise or fall in the degree to which it serves the public and the public interest. Business rises or falls according to its obedience to the economic law. Economics is a science. The laws which govern this science were established by the Master of man, not by the servants of man. These natural laws allow of no compromise, no appeasement, no procrastination. Nature takes vengeance for disobedience to these laws. Depression is a sanction of the economic law.

To the enterpriser industry is not the pump that draws up the resources of nature and converts and conveys them to the benefit of humanity. Industry is a means of earning a profit by utilizing the resources of nature to satisfy the material wants of man. It is striving to preserve free enterprise by producing more goods for more people at less cost.

To a student of human nature most leaders enjoy their power more than their responsibility. Some altruistic men welcome responsibility. It taxes their talents. Man has an inner urge to make the best use of the gifts which his Creator has bestowed upon him. However, a business leader has no license to utilize someone else's capital to become a humanitarian. . . .

As followers of Clarence B. Randall (Inland Steel) we say that if we are to have our greater era of production and prosperity, we of business and industry—executives, administrators, scientists, engineers and workers—had better start putting some of the money we take from enterprise back into it. If we fail the government will take up this responsibility for us. We shall inherit the socialism of England.

The most visible thing about today's American public is its willingness to mortgage the future of posterity and to pass its obligations on to the government while demanding a high material standard of living. As for the Europeans—they have been around the bush more times than we have. Let us profit from their experience, not ignore it.

The idea that Americans are materialistic may be unfortunate but it is true. Let's face the facts. A leader may not act on the facts but he must have the capacity to determine them. We owe it to the public as profes-

(*Continued on page 39*)


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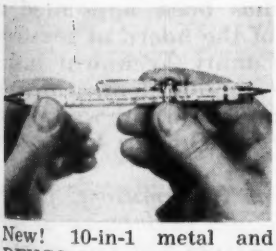

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# Professional News in Capsule Form

**Steinman Wins William Procter Prize • Survey Shows Demand for College Grads May Level Off • Tau Beta Pi Fellowships Include Industry-Sponsored Grants • Asphalt Institute to Build Research Center at Maryland University • Other Items of Interest**

**Dr. David B. Steinman, NSPE's first president and world-famed bridge engineer, has been awarded the $1,000 William Procter Prize for scientific achievement. The presentation was made during the annual meeting of the American Association for the Advancement of Science held in Boston recently.**

* * *

*The steady rise of industrial demands for both technical and non-technical college graduates may level off sharply this year, according to the results of Northwestern University's eighth annual survey of employment policies. The survey also showed, however, that a drop in demand will not affect the salaries industry is willing to pay to attract new graduates; and nearly half of the 151 firms reporting on policies toward engineering grads planned to pay more for beginning engineers in 1954 than they did in 1953. The salaries in prospect with 119 of these firms ranged from $326 to $400 per month, with an average of $345.*

* * *

**Two industry-sponsored fellowships are among those that will be awarded by Tau Beta Pi this year. The donor companies are the Louis Allis Company of Milwaukee, manufacturer of electric motors, and the Minneapolis-Honeywell Regulator Company of Minneapolis, manufacturer of automatic control equipment.**

**The deadline for mailing applications in this, the twenty-first year of the Tau Beta Pi fellowship program, is February 28, 1954, and awards are expected to be announced early in April. Paul H. Robbins, NSPE's executive director, is also director of the fellowship program which is open to all Tau Beta Pi members.**

* * *

*The Asphalt Institute, comprised of 46 oil companies with headquarters in New York, is planning to move its operations and research center to the University of Maryland campus, College Park, Md. A new three-story building will be erected to house the Institute and will be rented to the university, on a self-liquidating basis, as part of its engineering school. The Institute will set up fellowships at the university, and members of its staff will teach advanced university courses.*

* * *

**Brother Amandus Leo, dean of the School of Engineering at Manhattan College in New York City and a member of the New York State SPE, has been elected a Fellow of the New York Academy of Sciences. The fifth member of the Manhattan faculty and the first member of a religious order to become a Fellow of the Academy, Brother Leo was so honored in recognition of his leadership as a scientific educator.**

**He is a registered engineer in the State of New York, chairman of the Mayor's Advisory Committee of the Bronx County Planning Board, secretary of the Association of Engineering Colleges of New York State, and director of the Riverdale Home Owners Association.**

* * *

*Benjamin P. Robinson, an engineer with the firm of Knappen-Tippetts-Abbett-McCarthy and the chapter activities chairman of the Queens Chapter, New York State SPE, left recently for Rangoon, Burma, on assignment to the planning board that the New York firm has set up for the Burmese Government.*

* * *

**The American Concrete Institute will celebrate its golden anniversary at its annual convention scheduled for Denver, Colorado, February 22-25.**

**R. F. Blanks, vice president and general manager of Great Western Aggregates, Inc., of Denver and a member of the Colorado SPE, is serving as general chairman of the local committee for the event. Other committee members are: E. C. Higginson, B. W. Lorance, R. F. McCune, R. W. Morris, Orley Phillips, S. H. Poe, W. H. Price, D. Runyon, A. J. Ryan, and E. W. Thorson. Messrs. Phillips, Ryan, and Thorson are also members of the Colorado SPE.**

* * *

*Meyer F. Wiles, a member of the New York State Society of Professional Engineers, has been appointed deputy commissioner of the New York City Department of Public Works, according to an announcement by Commissioner Frederick H. Zurmuhlen, also an NYSSPE member. In addition to being a registered engineer, Mr. Wiles is also an attorney. He has served with the city government in various capacities for twenty-six years.*

* * *

**Edward S. Nunan, immediate past president of the New York State Society of Professional Engineers, has been appointed a member of the board of trustees of Erie County Technical Institute. The appointment, which is for a four-year term, was made by Governor Thomas E. Dewey.**

* * *

*Dr. Edwin H. Armstrong, professor of electrical engineering at Columbia University and the inventor of frequency modulation radio, has made a $50,000 grant to Columbia to inaugurate a study of the success of the nation's courts in deciding complex scientific questions.*

*The grant sets up a committee under the dean of the School of Law, William C. Warren. Other members*

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*of the committee, which will determine the scope of the study, are: Dr. Karl T. Compton, former president of the Massachusetts Institute of Technology; Bethuel M. Webster, president of the Association of the Bar of the City of New York, and Young B. Smith, Kent Professor of Law at Columbia and former dean of the Law School. John G. Palfrey, former member of the legal staff of the Atomic Energy Commission, will be in charge of research.*

* * *

**John Findley Peters, Westinghouse Electric Corporation consultant, has been awarded the Edison Medal by the American Institute of Electrical Engineers "For his contributions to the fundamentals of transformer design, his invention of the Klydonograph, his contributions to military computers and his sympathetic understanding in the training of young engineers."**

* * *

*The 40th Annual Illinois Highway Engineering Conference will be held in Urbana, March 2-4, according to an announcement from the College of Engineering, U. of Illinois.*

* * *

**Plans for a statewide drive to discover talented high school students and encourage them to choose scientific careers are being developed by the Minnesota Academy of Science. The Academy hopes to get industrial support for the program which it estimates will cost around $50,000 annually. The proposal calls for college scholarship grants to selected students with inadequate financial means of their own, in addition to encouraging students with genuine scientific aptitude to follow this bent in college and also advising them of suitable schools and available opportunities.**

* * *

*William L. Healy of the General Electric Company, Philadelphia, has been re-elected president of the Standards Engineers Society for 1954.*

* * *

**American business is currently understating its consumption of capital by about $7 billion annually, as the result of inadequate charges to depreciation accounts, according to a study recently completed by the Machinery and Allied Products Institute. Unrealistic write-off methods and inflation are among the reasons given by the Institute for this loss.**

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THE WHITE HOUSE
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December 9, 1953

Dear Mr. Forrest:

It is particularly fitting that the National Society of Professional Engineers has selected the week of Washington's Birthday as the period in which to observe National Engineers' Week. I heartily endorse this recognition of the engineering accomplishments of our Nation's first President, and I am delighted to use this occasion to pay compliments to America's engineers.

The Nation has long relied on the skill of its engineers. That skill has contributed to our comforts, our welfare, and our security against potential enemies. The responsibilities of our engineers become greater with the passage of each day, and each day we see new evidence of their success in meeting the tremendous challenge of our age.

To American engineers everywhere -- to those working in this country and to the many abroad who are contributing to the cause of peace -- I extend congratulations and best wishes. May the observance of National Engineers' Week in 1954 serve to remind our citizens once more of the great service performed by America's engineers.

Sincerely,

Dwight D. Eisenhower

Mr. T. Carr Forrest, Jr.
President
National Society of Professional Engineers
1121 Fifteenth Street, N. W.
Washington 5, D. C.

## *President Eisenhower's Message to the Nation's Engineers*

# Coast-to-Coast Programs Set to Go

FROM New York to California, chapters and state societies are galvanized for action so that February 21st will mark the kick-off of the biggest and best National Engineers' Week celebration to date.

One of the most interesting features that will be seen around the nation is the 5-minute TV movie, "Pilgrimage to Mount Vernon," with United States Senator George W. Malone of Nevada, the only registered professional engineer in the Senate, and NSPE President T. Carr Forrest, Jr., taking part. Actually filmed at historic Mount Vernon, it will introduce viewers to some very interesting sidelights on colonial and modern engineering accomplishments.

Senator Malone has also generously given his time to the preparation of the taped radio show during which he, President Forrest, and A. A. Potter, dean *emeritus* of engineering at Purdue University, discuss "Our Engineered Age." Another available radio show, also produced under NSPE offices, tells "The Engineering Story" through the voices of professional actors.

Senator Malone of Nevada

Like Senator Malone, many other civic officials and leading industrialists are preparing to give their endorsement to Engineers' Week activities in innumerable ways. Other engineering societies are also cooperating with NSPE chapters on the local level in developing special programs that will take cognizance of the spirit and the achievements of the engineering profession in all its many phases. There will be other original radio and TV shows; there will be speeches and forum discussions before community groups; there will be luncheons and banquets—all honoring "Engineering —Builder of a Strong America."

Under the able direction of Engineers' Week Chairman Anatole R. Gruehr, the groundwork for the observance has been well laid. With the myriad local events scheduled across the continent, February 21st to 27th should certainly be quite a week!

# 'Rededicate ourselves to... service,' Pres. Forrest

ONCE again we are about to take part in the countrywide observance of National Engineers' Week. We are about to call our fellow citizens—men and women from every walk of life—to focus their attention upon the achievements of our profession while we rededicate ourselves to the ideals of service to humanity that constitute the working creed of the professional man.

We have received a fine letter from President Eisenhower. We can be proud of the tribute that he has paid to the engineering profession, but we can accept that tribute only inasmuch as each one of us is ready to carry the ideals of this great profession into the future.

It is no idle gesture that the theme selected for the observance is "Engineering—Builder of a Strong America," for that succinct phrase encompasses not only the physical accomplishments of engineering—the building of bridges, the manufacture of airplanes, the design and production of the countless items that bring ease and comfort to daily living—but also the enlightened practice of good citizenship and the consideration of the needs of one's fellow men without which there cannot be complete and enduring national strength.

For members of the National Society, therefore, the celebration of National Engineers' Week from February 21st to 27th should be both an opportunity and a challenge. We should take advantage of the chance to tell our story in every small town and every large city, in every high school classroom and on every university campus, before civic groups and social groups, because we indeed have an outstanding heritage of accomplishments to which we may point with justifiable pride. But, realizing that we cannot legitimately glory in achievement unless we are also ready to work to live up to its concurrent responsibilities, we should use this week, too, as an appropriate time during which to consider the face of the future with its imminent and inevitable demands for greater and speedier technological progress and an increased and even more selfless professional spirit. While we are celebrating, while we are presenting the story of engineering yesterday and today, we might very well also take this week to do a little examining of our egineering conscience to make sure that we

(*Continued on page* 39)

**NSPE President, T. Carr Forrest, Jr.**

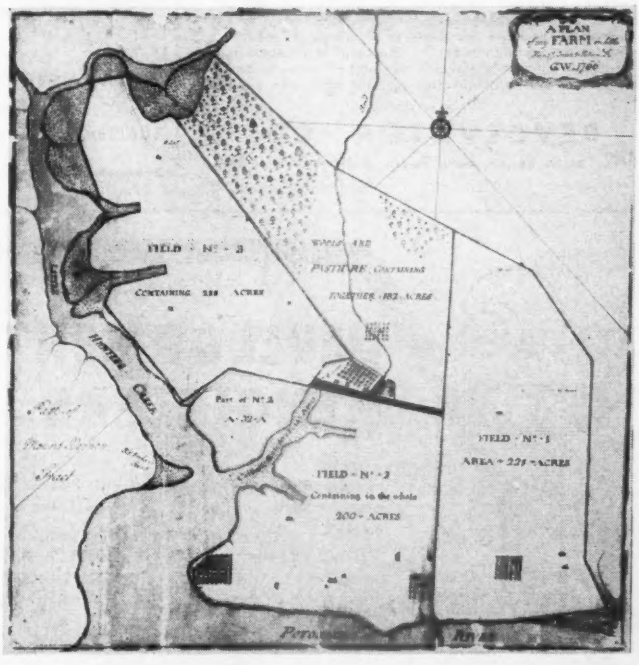
# George Washington: Engineer

THE complex and important science of engineering, which is honored during National Engineers' Week, February 21-27, is basic to the pace and structure of modern civilization. It is the key to the precision that makes the wheels of the world go round, and it certainly is also the passport to a more abundant future.

The United States, one might almost say, is the engineer's own country. America really grew up with engineering; and whenever you mention a historical *first* in its spectacular development, the chances are eight out of ten that there's an engineer, or a team of engineers, somewhere in the picture.

Foremost among the early giants in the field was the United States' first President, George Washington, whose birthday has been fittingly chosen as the pivotal date for the determination of the annual Engineers' Week observance. While his actual practice of the profession was limited to his younger years when, as a precursor of modern cadastral engineers, he took part in the often-recounted surveying expeditions for Lord Fairfax, he carried his initial interest in engineering into every other phase of his career.

The plan of his farm on Little Hunting Creek and the Potomac River, reproduced on this page, was drawn with an eye to accuracy that only an engineer would have. His appreciation of the value of military engineering, first learned during the days of the French and Indian War and later emphasized in the days of the Revolution, led him to urge the formation of the American Army's Corps of Engineers. He practically constituted a one-man lobby in favor of improved arteries of communication as a means to increase the economic health of the young Republic. And it was he who called on his old service

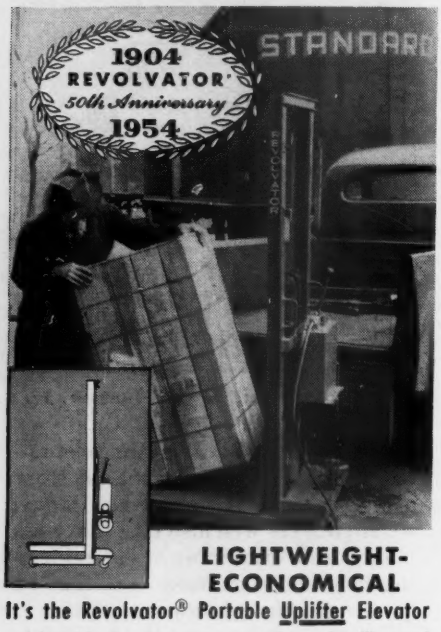



compatriots, engineers Pierre Charles L'Enfant and Andrew Ellicott, to lay out the capital city of the nation.

Taking pride in their profession during this February celebration, the engineers of the nation also feel a glow of satisfaction that they can count in their ranks so illustrious a forebear as George Washington, the first great Engineer-President in our history.

## *Magazine Renamed*

The name of the *Massachusetts Professional Engineer*, published jointly by the Massachusetts and Connecticut Societies of Professional Engineers, has been renamed the *New England Professional Engineer*.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"A very interesting and informative meeting" was the verdict of those attending the 14th Annual Land Surveyors Conference and Exhibition held at Rutgers University, New Brunswick, N. J., January 23rd.

The meeting was sponsored by the Land Surveyors Division of the New Jersey Society of Professional Engineers, and the keynote address was delivered by NSPE Executive Director Paul H. Robbins, who spoke on the topic, *The Surveyors' Status in the Society*. Other speakers included: Dr. Elmer C. Easton, dean of the Rutgers College of Engineering; Clarence T. Shoch, NSPE vice president for the Northeast Area; and William S. Dean, president of the New Jersey SPE.


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PAGE 11: Executive Research Survey Report: How to Attract and Hold Engineering Talent

PAGE 19: Here's What Industry Now Offers Engineers

—A Double Length Feature—

PAGE 27: A NEW Professional Engineers' Buyers Guide

PAGE 24: An Analysis of An Engineers' Salary Survey

PAGE 35: Names and Addresses of State Registration Boards



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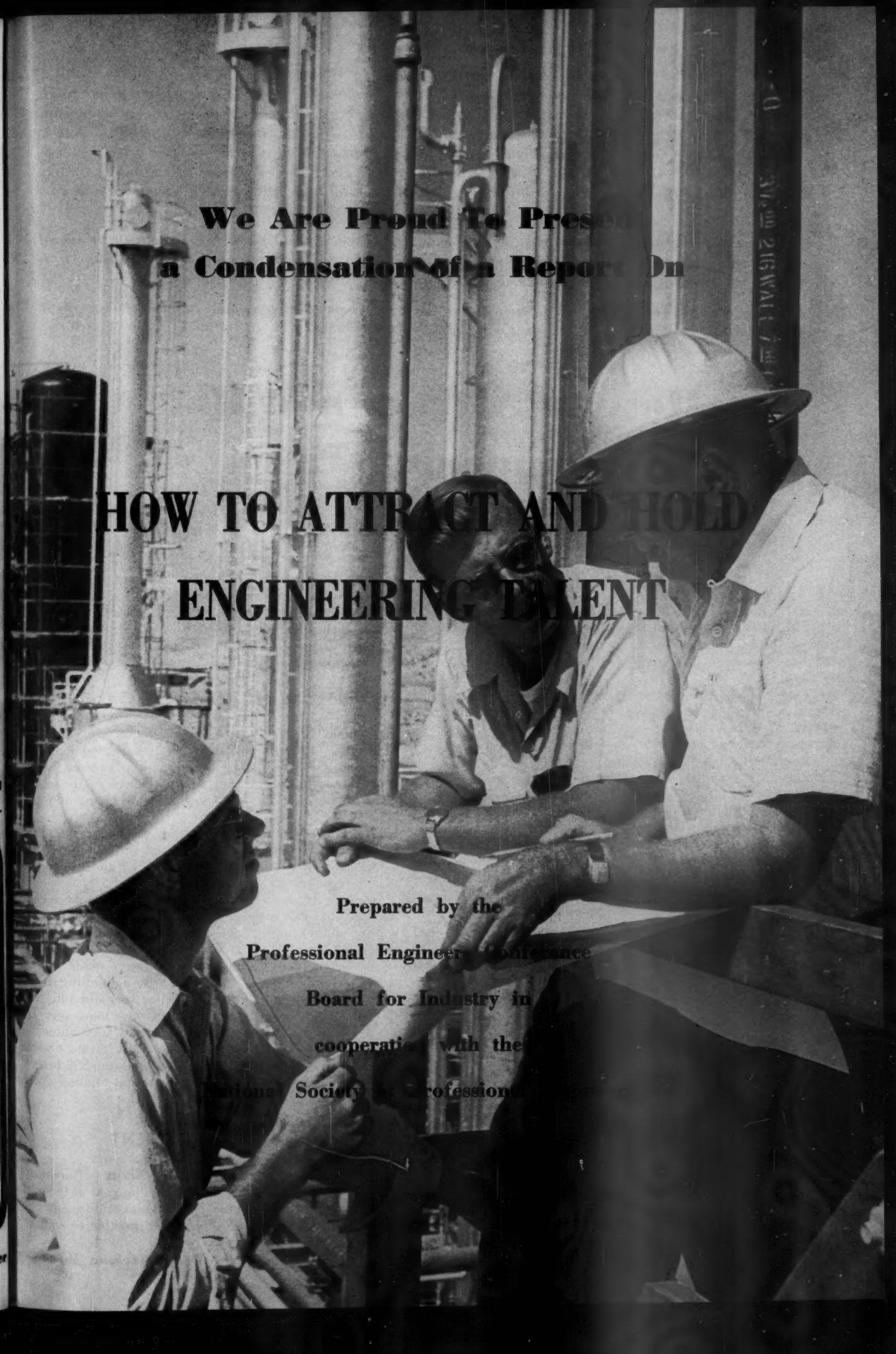

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# HOW TO ATTRACT AND HOLD ENGINEERING TALENT

Prepared by the
Professional Engineer Conference
Board for Industry in
cooperati with the
National Society for Professiona

**To Bring You Up to Date . . .**

***On the following pages is a condensation of a survey report on "How to Attract and Hold Engineering Talent." The survey of 200 leading firms and over 1,300 employed engineers, was conducted by the Professional Engineers Conference Board for Industry in cooperation with the NSPE. This is the third report issued as part of an intensified public relations program. The program, supported by contributions from the members, is designed to reach the employers of engineers. Nearly 10,000 copies of the report are now on their way to influential men in industry, education, and government.***

***Readers can help distribute this important work. On pages 14 and 15 of this issue, will be found information on how to obtain copies for a special price to Society members of $1.00 each. It is hoped that each Society member will aid in distributing this important information.***

***Read the condensation below and then order the full report to round out your knowledge of the subject. Then place the report where it will do the most good.***

# How to Attract and Hold Engineering Talent

*—A Condensation—*

## *introduction*

IN THE FACE of a diminishing supply of young graduate engineers, American industry today is confronted with an unprecedented demand for technically-trained personnel.

It is a demand which cuts through every field of engineering—manufacturing, heavy industry, governmental services, public utilities, teaching, research—weighing more heavily on some than on others, but affecting all to a serious degree.

The dilemma is one for which the engineer himself is partly responsible for he has developed new processes and inventions which in turn have created a demand for more, and still more engineers.

Also responsible is the fact that many engineering college graduates have been used by industry in work where lesser-trained personnel could perform the work satisfactorily.

It is a habit that still lingers despite the presently pressing demand for engineers for *engineering* work. . . .

## NO RELIEF IN SIGHT

Not only is it unlikely that there will be any appreciable closure in the gap between supply and demand, unless that closure is made from within, but industrial leaders and personnel experts are of the opinion that the situation as regards new engineers will become even more serious.

This is because of two factors. The first is the gradual decrease in college enrollment, the result of the sharp drop in the birth rate during the depression thirties. Since the peak year of 1950, when 52,000 engineering students were graduated, the number has dwindled each year to less than 21,000 in 1953. It is estimated the total will be only 17,000 to 19,000 in 1954 . . . no hopeful sign for those who look for aid from outside their own organizations.

The second factor is the growing complexity of the products of industry. Of the two, the latter is likely, in the long run, to be the more serious.

Almost everything we produce in the fields of mechanics and electronics has become vastly more complicated with a subsequent multiplication of engineering man-hours in the designing, planning and manufacturing processes.

## EVOLUTION INCREASES PROBLEMS

The field of aviation furnishes many striking examples of this trend toward more and more complicated machines. The F-86 Sabre Jet fighter, for instance, requires twenty-seven times more engineering man-hours in the manufacture than were required for the P-51 Mustang of World War II.

Similarly our automobiles, radios, television sets, heating and air conditioning units—everything, indeed, that we use—are becoming more complicated and are requiring more engineers to make them.

Not only have the goods themselves grown more complicated, but the means of producing them also are becoming increasingly complex as industry edges closer toward the goal of automatization.

Significant progress already has been made toward this end in the oil, chemical and fluid-handling industries; and in other fields, servomechanisms and automatic electronic controls are coming into increasing use. The Ford Motor Company, for instance, now uses automatic machining operations to turn rough castings into finished cylinder blocks with machines performing the 532 broaching, milling, boring, honing, drilling, and tapping operations automatically. . . .

## ENGINEERS IN MANAGEMENT

The growing technological complexity of industry has had another effect, too—the abandonment of the myth that engineers do not make good administrators; that the engineering concept is too narrow to be able to embrace

the broad view and the compromises required of industrial management.

But industry has found that as the machine grows more complicated, the non-technical administrator works under increasingly greater handicaps. As a result, a definite trend has developed toward the selection of engineers for top management posts, thus adding to the demand for more engineers.

Sales departments, too, are making increasing inroads in the engineering force as the complexity of the merchandise increases to the further depletion of the reservoir of engineering talent available to the manufacturing operation.

What, therefore, is industry to do to help close the gap between supply and demand? Or even to hold its own in the face of forces which seem to point toward an even greater widening of that gap? . . .

## REDUCING TURNOVER

Reduction of engineering turnover is one area where large savings in manpower can be made, and it was to learn how best that end might be realized that the present survey was undertaken.

The Conference Board started with the assumption that if management can provide a climate in which engineers can work happily and effectively in an employee-employer relationship while still retaining their professional attitudes, a large part of the problem will be solved.

To learn what makes such a climate, the Board sent researchers out to interview leaders in the industrial field, professional personnel directors and individual engineer-employees.

It also sent several thousand questionnaires to leading employers of engineers and to engineer-employees in all parts of the country, covering all types of engineering activity from manufacturing to pure research.

## RESULTS REVEALING

Two different types of questionnaires were used, one for employers and one for employees, but both covered the same areas so that, taken together, the answers provided checks against one another. The results, therefore, were far more revealing than those from either group, taken alone, would have been.

A comparison of those answers made it instantly apparent that both employee and employer are laboring under many misconceptions about the attitudes and goals of the other—misconceptions which, in many cases, could be eliminated with a minimum of difficulty.

The questionnaire provided clues not only to the identification of those points where friction is most likely to occur in the relationship between industry and its engineer-employees, but also to possible methods of lubricating those friction points to help bring about the desired end result.

# *who were surveyed . . . and what they do*

THIS SURVEY is a composite of the opinions of both management and engineer-employees in nearly 1,500 companies which operate not only in the United States but in many other corners of the globe as well, and which represent an accurate cross-section of American industry.

The industries represented included aircraft and automobile manufacturing, chemicals, petroleum, steel and other heavy industries; construction, consulting, design, and teaching, with manufacturing occupying the top place. Forty-eight per cent of the executives who responded, and forty-two per cent of the engineer-employees, were in the last-mentioned industrial category.

## THE TYPICAL EXECUTIVE

The typical executive among those who responded to the questionnaire is the vice-president of a manufacturing company in the northeastern part of the United States. His firm operates seven major plants, in which 5,000 persons are employed, 200 of them engineers.

The engineers in his firm's employ are steady, conscientious workers who are considerably less likely to fall down on the job, or to leave the company for greener pastures, than are the non-engineering employees. Fifty-five per cent said the rate of turnover among engineers was lower than that for non-professional employees, and twenty-eight per cent said it was about the same.

This would be a very pleasant picture, but—our executive has not been able to find enough qualified engineers on today's labor market to meet his company's requirements. He can still take up some slack in his own organization for about thirty per cent of his engineers are spending more than a quarter of their time on non-engineering tasks, and there are many who are ringing up a much higher percentage of time on clerical and sub-professional duties. But there is not enough leeway to solve his problem; he needs help.

## THE TYPICAL ENGINEER

Although the engineers surveyed range in age from twenty-one to eighty, the bulk of them were chosen from the lower age group because it is the younger men whom industry now seeks to attract . . . and hold.

Our typical engineer, therefore, is thirty-five years old, has been an engineer for nine years (with time out for military service), and has worked for his present employer, a large manufacturing company, for six years. He is one of more than two hundred members of the firm's engineering force; he does most of his work in an office, but gets into the field occasionally, and he supervises five other persons.

He is not a "drifter"—he wants to stay with his firm. He likes his work, but he is inclined to be unhappy about his salary and his chances of advancement. He does not know quite how he stands with his company, and he feels it is not making as effective use of his training and abilities as it could. He is employing only a part of his working day on purely engineering tasks, and he likes it that way . . . but he wants recognition as a professional and does not think he is getting it to the degree he should.

## THEY ANSWERED FRANKLY

Complete and frank responses to the survey questions were elicited from both groups because the Conference Board granted them complete anonymity where they desired it.

Permission to quote was asked of the executives, and in many cases it was granted, but where such explicit permission was not given, the replies were treated entirely confidentially.

In the case of the engineers, the questionnaire bore no identifying signatures or other marks, so the employee was protected completely and could answer freely many questions to which he might not otherwise have responded for fear of reprisals or other unpleasantness.

As a result, the report following represents a true and

comprehensive cross-section of the opinions of both groups —opinions which, at first glance, often seem to diverge sharply but which, on analysis, appear to be reconcilable with some not-too-drastic modification of personnel relations techniques.

## CHAPTER I

# *the raw material*

THAT THE BUSINESS of keeping engineers happy and contented in an employee capacity should properly begin in the schools is indicated clearly by the survey results. That the schools are not now doing their part to a maximum extent is indicated just as clearly.

On that point, both management representatives and engineer-employees are agreed . . . emphatically.

Eighty-eight per cent of the executives felt that the engineering schools are turning out graduates with an adequate background of knowledge of scientific fundamentals, but a majority (62 per cent) felt that these newcomers to the engineering ranks were sorely deficient in other areas of study.

## INADEQUATE TRAINING?

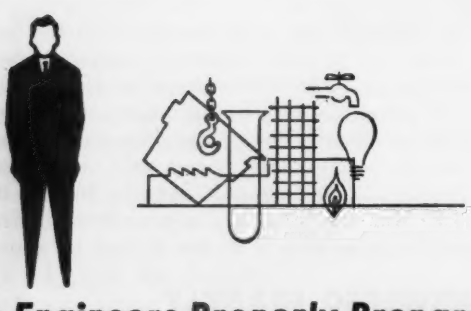
The engineers themselves indicated a recognition of that deficiency. Twenty-eight per cent of those who replied said they did not feel that their collegiate training prepared them adequately for a career in engineering, and most of those indicated a need for "more work in English, the social sciences and business administration."

The importance of this feeling of lack of adequate preparation as a factor in their subsequent adjustment as employees was emphasized by the fact that this group made up the bulk of those who expressed dissatisfaction with their lot in industry, particularly as regards their prospects of future advancement.

Thirty-four per cent of the engineer respondents indicated they were not satisfied with their prospects at their current places of employment, and into that group fell 90

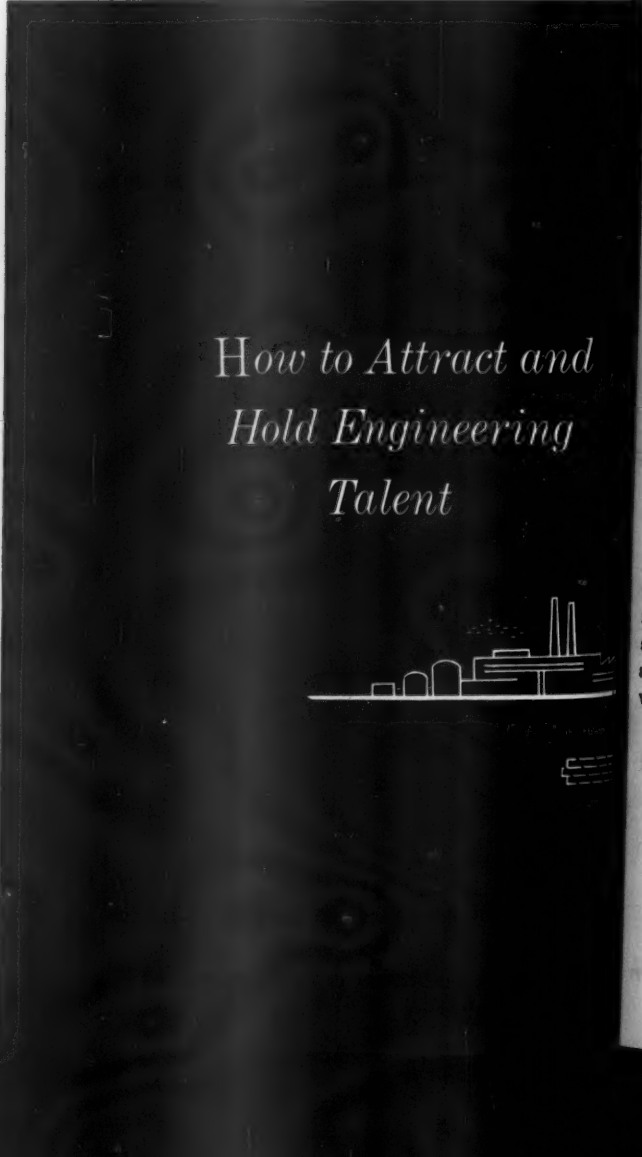

# What Makes an En

**What about tomorrow?**



**Are Engineers Properly Prepared?**

**What about Unions?**



per cent of those who felt inadequately prepared academically.

This would seem to indicate a vineyard in which industry's management might work with considerable profit to itself, as well as to the schools and to the engineering profession.

In considering the comments made above, it might be well to remember that the correlation between the criticism and the dissatisfaction may also have a correlation with the attitudes of the individuals. . . .

## EDUCATION vs. TRAINING

The criticism was echoed time after time in the questionnaires, and from management representatives who were interviewed in person. "More English," they said, "more humanities, more economics and business administration."

"Too many of our engineering schools," said William J. MacReynolds, vice president for industrial relations of the Philadelphia Transportation Company, "have become so over-specialized as to be not much better than trade schools.

"The so-called 'streamlined' curriculums will produce researchers and contractors, but they will not give to the graduate the well-rounded background without which he cannot hope to progress very far up the professional ladder.

"This, in my experience, does not make for a happy or well adjusted employee."

MacReynolds, who is himself an engineer, feels that industry should maintain a closer liaison with the colleges and assist faculty and administrators in the preparation of curriculums which will produce the kind of graduates industry wants. . . .

## ECHO ANSWERS "YES"

Many of the engineers themselves echoed the feeling that many of our colleges operate under concepts much too narrow.

"The training which our young college graduates have


# ineer Happy or Unhappy?

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*Recruiting Techniques*

*The Goal of the Young Engineer*

*The Professional as an Employee*

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received and the technical problems which they have learned to solve," said one, a veteran engineer employed by a large steel company, "are geared to the kind of work which they will not have to perform until they have spent from 15 to 20 years in industry.

"By that time, they have either long forgotten how to solve these highly technical problems or, more likely, the methods used in college have long since become obsolete.

"On the other hand they are not sufficiently trained in the manual dexterity required to make working drawings and they are not even sure enough in simple arithmetic to satisfy the demands of the jobs they actually fill as beginners. Besides being unable to perform what is demanded of them, which makes them very unhappy, they are even more grieved by not being able to get into the kind of work for which they have trained themselves at great cost of money, time and effort. Dissatisfaction all around!"

Another wrote:

"Industry needs closer liaison with the schools and students during the first years of the college course. Many a student has not learned until his senior year what an engineer actually does, and is repelled by the routine which he did not even know existed." . . .

## CHAPTER II

# *recruiting techniques*

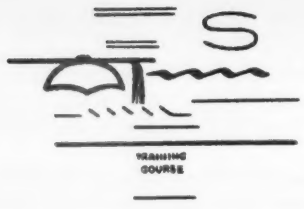
*"Big business is literally begging fledgling engineers to come to work for it. Hungry scouts from airplane, auto, chemical, oil, utilities and steel companies have been sweeping the nation's campuses, exercising all the salesmanship at their command, in an unprecedented drive to recruit new engineering talent to fill American industry's pitifully sparse ranks, and there is no sign that the insatiable demand will abate."*

THAT IS the way a popular magazine* not long ago described the hectic competition which has been going on on the campus for the last two years as the dwindling crops of graduates and the increasing technological complexity of industry widened the gap between supply and demand. Unfortunately, it's true . . .

## BUBBLES WILL BURST

The survey questionnaire circulated to the engineers tells the story. To the question: "Was your first job actually

* *Collier's*, October 2, 1953.



as it was described to you at the time you accepted employment?" 20 per cent answered "no." Most of the members of that group were younger members of the profession who entered it during the high demand of the last few years.

But even more significant:

Nearly all of those who answered "no" today are unhappy in their jobs. They are candidates for "greener pastures," and their companies face the potential added expense of recruiting and training new replacements for them.

Many of them, after months of routine work on a drafting board or in testing, analysis or computation assignments, are bored, and do not feel that their companies are making use of the talents for which there was such frantic bidding only a few months before.

So they themselves, with their answers to the survey questions, indicate all too clearly that such flamboyant recruiting tactics usually pay off, in the long run, only in the coin of discontent.

Here is the evidence:

*Q. Do you feel your company recognizes your professional status?*

29 per cent answered "no."

*Q. Do you feel your company is making effective use of your training and ability?*

38 per cent answered "no."

*Q. Are you satisfied with your present job with respect to five different factors?**

38.6 per cent answered "no" with regard to two or more factors.

And each of those "no" groups included most of those who felt they had been "oversold" on their jobs.

## $UCCE$$FUL RECRUITING?

There is a large body of personnel people who sum up their most successful recruiting practice in one word:

* Salary, prospects, nature of work, working conditions, location of work.

***(See Other Side)***

MONEY!

Although there were varying degrees of literary ornamentation, that is the way a large number of the executives, like Walter W. Offner, president of the X-Ray Engineering Company, Mill Valley, Calif., answered the survey question: "What inducements or techniques has your company found most effective in recruiting new engineering employees?"

Most of the engineers themselves seem to disagree with this viewpoint, however, since only 12.3 per cent of those surveyed gave "financial rewards" as a reason for their choice of engineering as a profession. (A majority—73.5 per cent—said they entered the profession because of "engineering aptitudes.")

Answers to other survey questions, however, lead indisputably to the conclusion that the engineer's rate of pay becomes one of the most important factors in keeping him contented, if not *the* most important, after he gets over his apprenticeship and the attendant glamor of entering a new profession.

Although engineers in general today are enjoying the highest rates of pay in history (see *Professional Engineers' Income and Salary Survey**), forty-five per cent of those surveyed declared themselves dissatisfied with their present salaries, and a majority of the executives questioned said that offers of more money by competing firms constituted the largest single factor in their engineering turnover.

This apparently is true, however, only of the engineer who has been in the profession long enough to have acquired a wife and family, since the younger respondents to the questionnaire—the Engineers-in-Training—in the main were satisfied with their salaries, and, for the most part, with all other factors concerning their jobs.

It would seem, therefore, that money is not quite so important a factor in recruiting as some of the younger and more aggressive companies believe.

The older, established firms seldom have found it necessary to engage in the competitive practice resorted to by a few of the newer, fast-expanding plants which have mushroomed on war contracts and have found themselves facing an ever-growing need for professional help. . . .

## CHAPTER III

# *the goal of the young engineer*

ADVENTUROUS ENGINEERS still are building radio stations high in the Andes, air fields in Africa, and submarine bases in the far north, on the fringes of the Arctic Circle. There still are modern counterparts of Goethals and Steinmetz and Hoover creating new miracles in jungles and deserts and mountains.

But the many young engineers of 1954 are not looking for glamor in far places, but for security, both immediate and for the years to come. They want not only adequate compensation but also professional recognition and a sense of personal accomplishment.

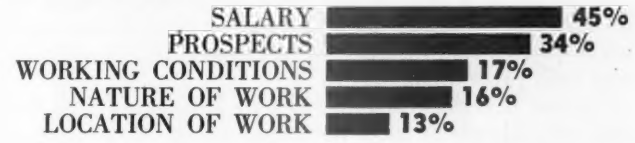
### DEPRESSION PSYCHOLOGY REMAINS

Although they were still small boys when the great depression of the thirties ended, many young graduates of today still remember its dislocations and its effects, perhaps on their own families, and they want a safe berth for themselves in industry.

Reasons for entering the engineering profession, as brought out in a previous chapter, were first, engineering aptitudes (73.5 per cent); secondly, professional status at work (16.6 per cent); and thirdly, financial rewards (12.3 per cent).

But after they have been in industry for a time, some attitudes change, as shown by the question: "Are you satisfied with your present job?"

Five different factors were listed, and all were answered in the negative as follows:




A number of the executives questioned felt that the engineer's preoccupation with money was a manifestation of a "something for nothing" attitude—that he was more interested in what he was going to get out of industry than in what he was going to put into it. . . .

### DIFFERENCE OF OPINION

Eighty-five per cent of the executives answered in the affirmative—but 50 per cent of the engineers said "no."

It is possible that both were right, since many times more engineers than executives were surveyed, and the latter were hand-picked from among companies known to have progressive and successful personnel policies, whereas the large sampling of engineers was not but was intended rather to represent a fair cross-section of American engineering activity.

It is plain, however, that more than half of that large group of engineers do not know whether their employers are satisfied with their work. And they would like to know.

It would appear that in the great industrial expansion of the last few years, in the rush to turn out the tremendous volume of materials and manufactured goods demanded by the military, perhaps industry *has not* given enough thought to supervision and guidance, and perhaps, because of the shortage of professional talent, the tendency has been to move young engineers up to positions of responsibility before they were ready for it. . . .

## CHAPTER IV

# *the professional as an employee*

THE YOUNG ENGINEER as an employee sometimes finds it difficult to adapt the traditionally objective viewpoint of the professional to the hard facts of competitive business.

A very large number of the executives, like J. Robert Tomlinson, executive vice president of the Borden Corporation, Danbury, Conn., complained about the young engineer's "research approach" and his lack of knowledge of practical economics as applied to, and in, the industries in which he will find employment.

### UNPROFESSIONAL ATTITUDES?

Sixty-two per cent of those surveyed felt that the young engineers' attitudes are unprofessional, although one,

* Available from the National Society of Professional Engineers. Single copies, $1.00, non-members; $.50, members.

ıngolf F. Kvamme, division engineer of the Duquesne Light Company, Beaver, Pa., added that "men do not feel like professionals when they are paid less than skilled labor," and others asserted a professional attitude is gained only by experience.

A majority of the companies participating in the survey admitted that they made little or no distinction between engineers and non-professional employees insofar as their personnel policies are concerned; and the 40 per cent who said they do so, observe the distinction for the most part only to the extent that they pay their engineers salaries on a monthly basis and do not require them to punch time clocks.

Even so, it is evident that some intangible distinction generally is observed, for only 29 per cent of the engineers queried said they do not feel their companies recognize their professional status.

Certain it is that personnel practices designed to fit the rank and file rarely meet the requirements of the professional employee.

The minority group of employees—the 29 per cent who feel that their professional status is not recognized—while a minority, still is large enough to be of concern.

## CAUSES OF RESENTMENT

A number of them, interviewed personally, complained of being treated "like any other employee," and one, who worked in a manufacturing plant with a government security status, was bitterly critical because he, like other employees, had to open his brief case for the guard's inspection on entering and leaving the grounds!

This, of course, was carrying the point to absurdity, but it is evident that there is a large number of engineers who *are* "treated like any other employee," and who resent it strongly.

Management representatives in the same plant, on the other hand, complained that many of the engineers do not think of themselves as "working for the company" but have the attitude that the company, as one put it, "is a laboratory operated for their own special benefit."

Obviously, understanding is needed on both sides . . .

## CHAPTER V

# *benefits and incentives*

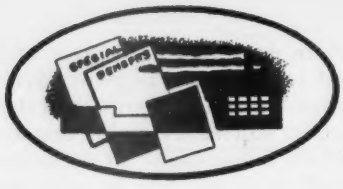
WHAT PART do benefits play in the attraction and retention of engineer-employees? That question was asked of scores of executives and engineers in a number of plants along the eastern seaboard, and the answer in every case was the same:

"None, except from a negative standpoint."

Because virtually every large plant, and most smaller ones as well, now offer such benefits as group hospitalization, low cost insurance (or in some cases, policies paid for entirely by the company), pension plans and elaborate recreational facilities, they have ceased to be inducements from the standpoint of recruiting.

## REPRESENT SECURITY

But—the company that does not offer them is at a considerable disadvantage, both from the standpoint of recruiting and of keeping its employees happy once they get on the payroll, for those benefits represent extra dollars and cents in the pockets of the employees, and security against emergencies.




Incentives such as unusual opportunities for training and advancement professionally are much more important, according to the survey respondents, first, because they are vital rather than static factors in which the employee himself plays the important part, and secondly, because they are not offered on nearly so widespread a basis.

The benefits, in the main, are offered to all employees, professional and non-professional alike, as are many of the incentives, but from the latter category come any special inducements which may be offered engineers and other professionals. . . .

## CHAPTER VI

# *what about unions?*

IT IS AXIOMATIC that Americans are apt to render snap judgments when asked to take sides on a controversial question, but when they are quizzed on their beliefs regarding pertinent questions bearing on the main issue, they are likely to exhibit a leaning quite opposite to the stand initially taken.

In keeping with that tradition, the engineers who responded to the survey questionnaire indicated clearly that they regard themselves as professionals and wish to be so regarded by their employers; that they are impatient of regimentation, and want to stand on their own feet and so grow professionally.

But thirty-four per cent of them answered in the affirmative the question: "Do you believe engineers' interests are strengthened economically or otherwise by membership in a collective bargaining organization?"

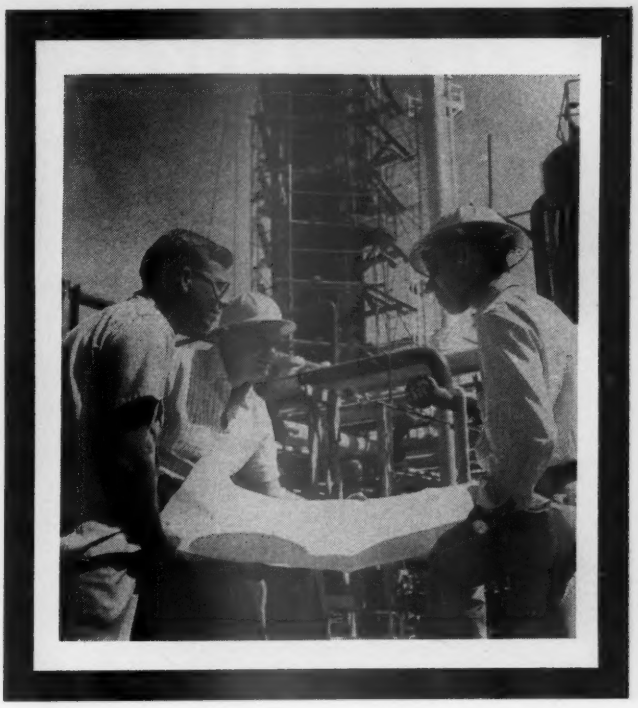
## NO MALCONTENTS THEY

Nor were these voters in the affirmative malcontents who were dissatisfied with their jobs and groping for something better. They were a fair cross-section of the entire group surveyed.

Represented in this group of thirty-four per cent were approximately the same proportions of contented and discontented engineer-employees. It is evident, therefore, that the leaning toward labor organizations of so high a percentage of men who are professionals both by training and inclination has little or no connection with their attitudes toward their own jobs.

It is perhaps significant that the opinion voiced by this group was formed by most of its members without any actual experience with a labor organization, for of the more than 1,300 engineers queried, only about six per cent are employed in plants which have collective bargaining organizations for professional employees. Of that relatively insignificant number, only half belong to the union.

Of the sixty-six per cent who answered the question on unionization in the negative, a large percentage of them indicated their emphatic disapproval with exclamation points and penciled comments on their questionnaires . . .



**Grumman Aircraft engineers (above left) have every chance to advance to administrative-type positions. Among incentives offered Standard Oil of California engineers, such as the plant design team (above right), is the opportunity to join a stock-purchase plan.**

# Here's What Industry Now Offers Engineers

## An NSPE Survey Reveals How Leading Firms Rate Their Incentive Programs

ACCORDING to top management and personnel men in industry, today's engineer—and in particular, the *young* engineer—can view his job prospects with optimism and confidence. Then when he does accept a position with one of the country's leading firms, he is going to find a wealth of incentives designed to keep him happy on the job and encouraged about the future.

And incentives are what the modern engineer wants. A survey conducted a little more than a year ago among 500 companies by the Professional Engineers Conference Board for Industry, in cooperation with the National Society of Professional Engineers, emphatically brought out the fact that engineers are more interested in the *incentives* a job offers than in the *benefits* involved.

Benefits, defined as "whatever promotes welfare," include such items as hospitalization, insurance, and pension plans; whereas incentives, described as "motives, whatever incites to action," generally cover the broad scope of opportunity for advancement jobwise and moneywise. The relative importance of incentives to engineers was determined by the Conference Board survey to be as follows:

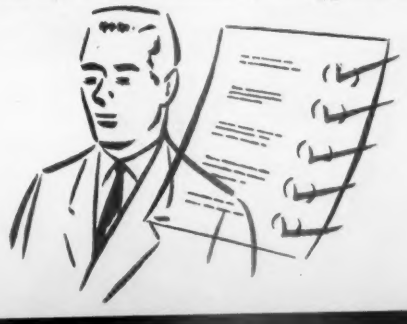
1. Opportunity for advancement.
2. Stability of employment.
3. Chance to receive extra training.
4. Essential industry.
5. Profit sharing plans.

In order to present a view of the other side of the coin, the AMERICAN ENGINEER has recently queried a number of leading companies as to how they evaluate themselves on these five incentives which are regarded as so important by their present and prospective engineering employees.

The answers received have been unanimous in painting a bright picture of what industry now offers engineers. Management quite evidently feels that it is providing every opportunity for the capable and industrious engineer, that the incentives are there for the man who is willing to make the most of his chances.

It is interesting also to note that one of the replying firms—the Raytheon Manufacturing Company, an electronics firm of Waltham, Massachusetts—called attention to a sixth incentive that it felt should be listed among those most important to engineers in industry; namely, the incentive of professional recognition. "This recognition," said William W. Drake, Jr., assistant to the vice president in Engineering and Research, "is largely indefinable, but exists only to the extent that it is reflected in the attitude of management."

While no other respondent spelled out the need for management's attention to the professional recognition problem so distinctly as did Raytheon, nevertheless similar concern with the problem was reflected in many of the other firms' commentaries on the five specified incentives, and particularly in the summaries of opportunities avail-

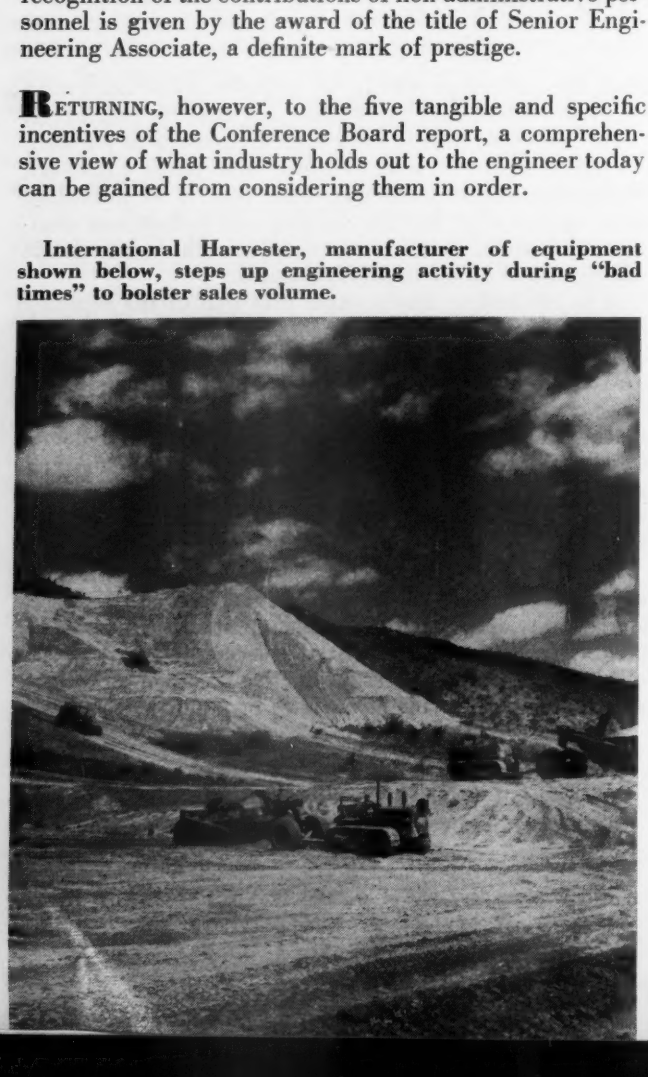


**The Raytheon Manufacturing Company, two of whose engineering specialists are shown above, believes that its policy of "professional recognition" is a highly important incentive for engineers.**

able for advanced training. One company, for instance, noted the opportunity it gives its experienced engineering employees to attend professional conferences. Another—the Standard Oil Development Company, which is the central research and engineering affiliate of Standard Oil of New Jersey—pointed out in its remarks on chances for advancement that, in addition to salary increases, special recognition of the contributions of non-administrative personnel is given by the award of the title of Senior Engineering Associate, a definite mark of prestige.

RETURNING, however, to the five tangible and specific incentives of the Conference Board report, a comprehensive view of what industry holds out to the engineer today can be gained from considering them in order.

**International Harvester, manufacturer of equipment shown below, steps up engineering activity during "bad times" to bolster sales volume.**



## Opportunity for Advancement

In every case, the companies replying to the AMERICAN ENGINEER query reported the opportunity for advancement within their organizations as excellent. Diversity of operations was singled out by a number of firms, including Pittsburgh Plate Glass and Kaiser Industries, as a major contributory factor to such opportunity. The United States Rubber Company pointed out in its reply that even within each division there are frequent opportunities for new assignments, including those which offer a complete change of duties during a man's progress.

Parallel to and sometimes a component of the factor of diversity is that of expansion. The growth of many industries since the close of World War II has indeed been spectacular. In the electronics field, for example, total employment has doubled since 1947 bringing many contingent opportunities for mechanical, chemical, and metallurgical as well as electrical engineers. The unprecedented growth of the aircraft industry scarcely needs discussion. A representative firm in the chemical field, the Mathieson Chemical Corporation, Baltimore, Maryland, cited an estimated $270 million in sales in 1953 as against $31 million in 1948 as proof of the impressive growth that has provided increased opportunities for its engineers, while the Sun Oil Company of Philadelphia pointed to its present employment roster of approximately 20,000 employees as against about 10,500 in 1942 as one indication of the opportunities in its field. And the Firestone Tire & Rubber Company replied from Akron that: "Frankly, our growth has been of such a nature that all of our men who so desire have had every opportunity not only to continue with the company but to take on additional responsibilities." A man with the ability to advance, said a Firestone official, has every chance to do so.

GENERAL Electric Company's vice president of Engineering Services, Clarence H. Linder, succinctly summarized the expansion situation, writing from Schenectady as follows: "The electrical industry is growing faster than the industrial system as a whole. . . . From $2.6 billion in 1952 General Electric expects its sales will rise to about $5 bil-

**Diversity of operations means many opportunities for advancement for Pittsburgh Plate Glass Co. engineers, two of whom are pictured above left; while General Electric's test program gives beginning engineers, such as the young man above right, a chance to show their skills in progressively more difficult jobs.**

lion in 1961. This increased volume of business represents increased engineering output and with it a substantial increase in the total number of employed engineers. The growth in engineering and management jobs will have to come from those already employed and the new engineers who will join the company in the next few years. An expanded organization draws a vacuum behind it which has to be filled by pulling manpower from other levels. This means promotions and increased responsibilities for those involved."

Promotion from within, systematic performance appraisal, and merit increases were underscored as key policies by most of the responding companies. The Koppers Company, Inc., of Pittsburgh is one firm that conducts an annual "management inventory" to provide for the scheduled advancement of qualified personnel. And the accent is definitely on youth. The Aluminum Company of America, for one example, reported from Pittsburgh that its policy is to employ only recent college graduates; and other firms manifested similar interest in the *young* engineer in their replies, with emphasis also on the young (that is, mid-thirties to forty) management man in some instances.

In the latter regard, too, there was no evident prejudice against giving the capable engineer a chance at appropriate administrative positions. In fact, a number of firms pointed out that positions of administrative responsibility were open to the engineer who preferred that line of advancement to strictly technical specialization. The Grumman Aircraft Engineering Corporation's reply embodied the essence of the over-all view: "The increasing complexity of modern aircraft design necessitates the employment of a larger number of engineers with consequent opportunities for the advancement of outstanding specialists and capable supervisors. The need for exceptional administrative capabilities is becoming more evident and provides the openings for advancement for engineers of the right caliber."

## Stability of Employment

Operational diversification was again widely quoted as the key to the presence of the second incentive, stability of employment, on which all the replying firms felt they rated a good score.

H. S. Manwaring, the assistant director of Engineering with the International Harvester Company of Chicago, wrote, for one, that stability of employment was not a problem in the firm's engineering departments. "In times of deteriorating economic conditions," he stated, "the work of our engineers is increased in order to stimulate business, through improvements and new products, in the effort to maintain sales volume." The U. S. Rubber Company sent a similar report from New York, emphasizing its policy of keeping its research facilities in use in so-called "bad times," and adding that: "From season to season the company schedules its production so that there are no radical increases and decreases in the employment in our plants." And Mathieson Chemical was among the others reporting that its planned diversification program, which has taken it into a basic position not only in inorganic chemicals but also in organic chemicals, agricultural chemicals, and drugs and pharmaceuticals, would definitely continue.

One firm in the electronics field was frank to point out, however, that in the years of that new industry's development there was "a period where the less strong fell by the wayside." But now, with electronics indeed becoming a part of modern living, the company feels that stability of employment is assured. This view—that stability of employment for engineering personnel in the electronics field is here to stay—was seconded by C. T. Foss, vice president of Engineering with the Arma Corporation of Garden City, New York, who stated that, while production requirements vary from time to time, research and development requirements remain uniformly quite stable.

In the aircraft industry where there have been employment dips and rises affected primarily by the nation's military situation, the Grumman Corporation, which prides itself on maintaining its staff without layoffs for many years, replied to the AMERICAN ENGINEER in terms that seem to echo the industry-wide feeling. The Long Island firm reported that: "The growing complexity of

**Above, an engineer checks Quantometer readings at the Trentwood Spokane, Washington, plant of the Kaiser Aluminum and Chemical Corp., one of the "essential" Kaiser industries.**

experimental aircraft and design requires the services of many more engineers than on older models and appears to assure our maintaining a strong engineering force as long as the government feels it advisable to maintain the superiority of American-designed aircraft."

Another company in aircraft production—Fairchild Aircraft of Hagerstown, Maryland, a division of the Fairchild Engine & Airplane Corp.—in addition to quoting the steady growth of its Engineering Department since 1929, also stated: "The nature of our contracts, our location, and the relatively low cost of living in our community have figured heavily in the stability of our over-all personnel situation."

Other firms, such as Kaiser Services reporting from California for Kaiser Industries, cited turnover and termination figures as concrete evidence of employment stability. One company in the explosives field stated that its engineering force had not varied more than 10 per cent in any one year since the war and that most of the change had been upward; in this particular case it is also interesting to note that the steady keel is maintained to a degree because of the practice of "farming out" engineering work when there is more than can be handled by the regular staff.

ANOTHER firm to cite statistics was one in the heavy construction machinery field. It pointed out that of the hundreds of employees who have participated in its twenty-three-year-old College Graduate Training Course, approximately 75 per cent are still with the company in various capacities that include technical engineering as well as management and administrative positions.

Professional employees who leave the Standard Oil Development Company (New Jersey affiliate) amount to only about 4 to 5 per cent a year. This figure includes retirement and death statistics as well as the resignation and discharge count; and in addition, approximately 1.4 per cent of this professional turnover is actually accounted for by transfers to other affiliates of the Jersey Standard group, which cuts the rate even further. Another oil company—Sun Oil of Philadelphia—also emphasized an over-all record of employment stability throughout the petroleum industry and quoted its policy of transferring personnel to other positions within the company when changes bring about the elimination of their original jobs. Still a third oil firm—Standard of California—mentioned loyalty to the company as an important factor in the stability picture; it is explained in a California Standard career brochure that such loyalty can be earned only by making a company "a good place to work," one of many indications of management's acceptance of responsibility in maintaining the stability incentive.

A final interesting footnote on the stability incentive came from T. M. Hunt, director of technical placement with the Aluminum Company of America. Mr. Hunt reported that Alcoa has found that the question of stability is not frequently discussed by the average *young* engineer in employment interviews, and that the company would rank it fourth rather than second in the incentive list on the basis of its experience.

## Chance to Receive Extra Training

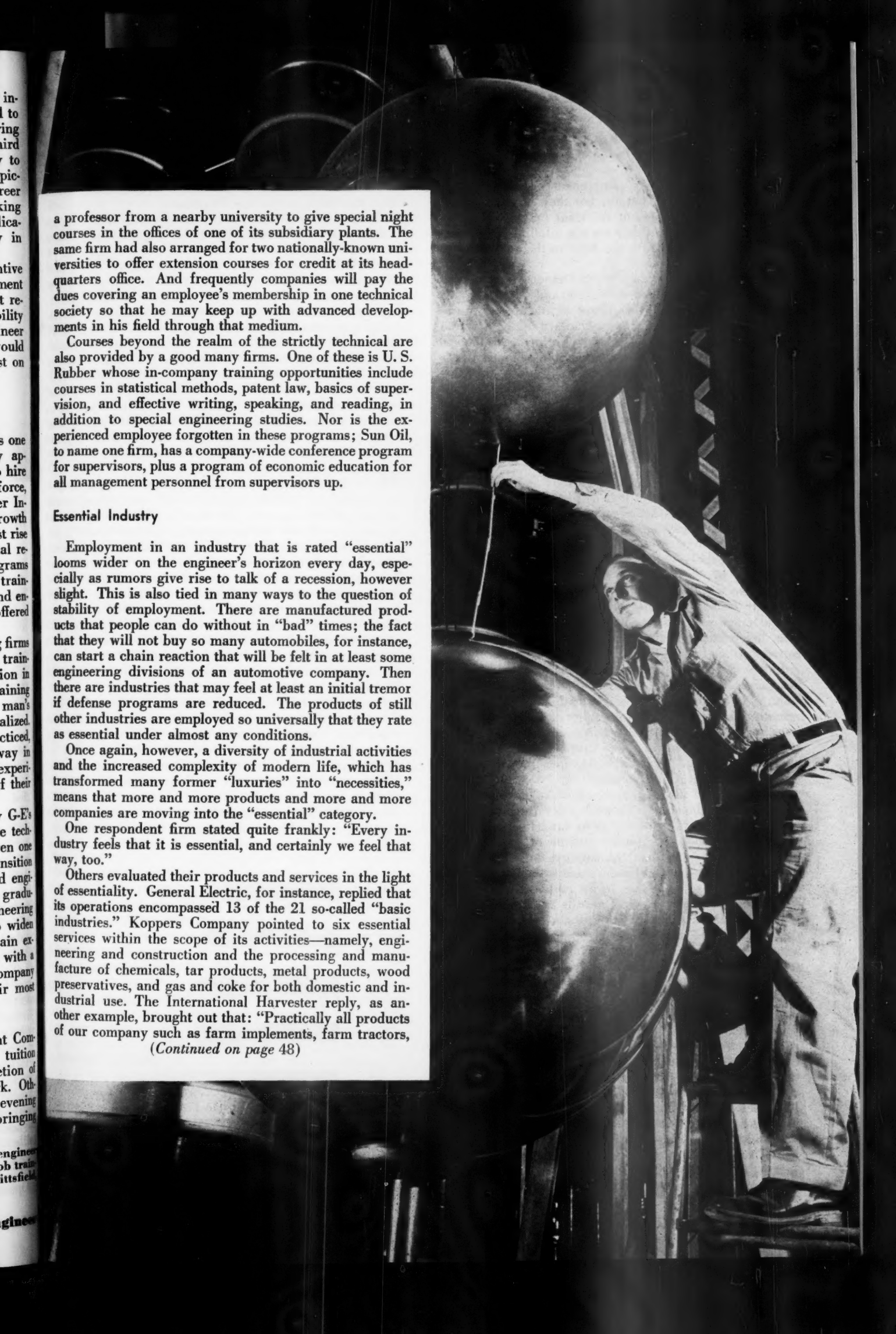
The desire for a chance to receive extra training is one that is universally recognized and enthusiastically approved by management. Alcoa, whose policy it is to hire only recent college graduates for its engineering force, ranks this incentive as second in importance. Kaiser Industries regard it as a "must" because of the rapid growth of the various companies "and the accompanying fast rise of our engineers from 'trainee' status to managerial responsibilities." Even companies with no formal programs urge their employees to acquire additional technical training on their own and give them all consideration and encouragement to make the most of opportunities offered by nearby educational institutions.

The advanced training provided by the responding firms takes various forms. The majority have on-the-job training programs, which differ according to the division in which a man is employed. In some instances this training is largely informal and is the responsibility of the man's supervisor; in other cases the program is more formalized. Job rotation in at least three major areas, as practiced, for example, by the Arma Corporation, is one way in which a number of firms seek to contribute to the experience and determine the field of optimum ability of their junior engineers.

A typical training program is that described by G-E's Clarence Linder: "In General Electric, most of the technical graduates employed by the company are given one or more years of extra training to provide a transition stage between academic life of college and applied engineering of industry. In these training programs graduates are exposed to several different types of engineering work in various production divisions in order to widen their horizons. They are given opportunity to gain experience to help them select their fields of work with a better knowledge of their opportunities, and the company can evaluate the men and aid them to find their most satisfying field of usefulness."

MANY firms, like the Standard Oil Development Company, will reimburse a substantial portion of the tuition fee to any employee upon his successful completion of advanced university courses bearing upon his work. Others, like Grumman Aircraft, are participants in evening school scholarship plans. One company reported bringing

**In the photo on the opposite page, a young G-E engineer measures spark gap distance as part of his on-the-job training at the company's high voltage laboratory in Pittsfield, Mass.**



a professor from a nearby university to give special night courses in the offices of one of its subsidiary plants. The same firm had also arranged for two nationally-known universities to offer extension courses for credit at its headquarters office. And frequently companies will pay the dues covering an employee's membership in one technical society so that he may keep up with advanced developments in his field through that medium.

Courses beyond the realm of the strictly technical are also provided by a good many firms. One of these is U. S. Rubber whose in-company training opportunities include courses in statistical methods, patent law, basics of supervision, and effective writing, speaking, and reading, in addition to special engineering studies. Nor is the experienced employee forgotten in these programs; Sun Oil, to name one firm, has a company-wide conference program for supervisors, plus a program of economic education for all management personnel from supervisors up.

## Essential Industry

Employment in an industry that is rated "essential" looms wider on the engineer's horizon every day, especially as rumors give rise to talk of a recession, however slight. This is also tied in many ways to the question of stability of employment. There are manufactured products that people can do without in "bad" times; the fact that they will not buy so many automobiles, for instance, can start a chain reaction that will be felt in at least some engineering divisions of an automotive company. Then there are industries that may feel at least an initial tremor if defense programs are reduced. The products of still other industries are employed so universally that they rate as essential under almost any conditions.

Once again, however, a diversity of industrial activities and the increased complexity of modern life, which has transformed many former "luxuries" into "necessities," means that more and more products and more and more companies are moving into the "essential" category.

One respondent firm stated quite frankly: "Every industry feels that it is essential, and certainly we feel that way, too."

Others evaluated their products and services in the light of essentiality. General Electric, for instance, replied that its operations encompassed 13 of the 21 so-called "basic industries." Koppers Company pointed to six essential services within the scope of its activities—namely, engineering and construction and the processing and manufacture of chemicals, tar products, metal products, wood preservatives, and gas and coke for both domestic and industrial use. The International Harvester reply, as another example, brought out that: "Practically all products of our company such as farm implements, farm tractors,

(*Continued on page* 48)

***About an Interesting Subject: Money***

# Analyzing A Salary Survey

STATISTICS are much like comprehensive indexes. They do not tell the whole story, but they serve as guideposts to it. They present the *what* but not the *why*. They indicate trends, but they are not infallibly prophetic. They are the clues but not the keys to the variables behind a situation of fact.

The interpretation of salary and income statistics is particularly difficult because dollars and cents as such actually constitute only one phase of the true measure of income. There are many non-pecuniary intangibles that affect the real meaning of the money in hand. An income of $4,000 in a small community, for example, may be the equivalent of $6,500 in a larger city. Also, in considering the income of the independent practitioner for any one year, it is important to remember that he is the most vulnerable of all when it comes to income fluctuations, that his relatively high receipts one year can be upset and offset to a considerable degree by one bad month in the next year.

Nevertheless, specific earning periods and dollars and cents are the only criteria that can be used to determine basic clues to the measurement of income status. And dollars-and-cents income data is very important to the young man who wants to choose a career in the field with good financial potential, to the older man who wants to "grade" his relative success on this basis, to the employer who wishes to evaluate the financial incentives, he offers in the light of those offered by others, to the successful employee who is contemplating establishing his own independent business or wondering if he should transfer to another industrial field.

In an effort, therefore, to uncover the most telling clues bearing on the financial status of the engineering profession, the National Society of Professional Engineers has recently conducted an income and salary survey among its members—all registered professional engineers. The calendar year chosen for this purpose was 1952, and the resultant data obtained from 12,443 questionnaires offers much that is useful and valuable.

In addition to income (and only that having a strict relationship to the engineer's work was considered), year of entry into the profession, major branch of specialization, area in which the greatest amount of applied working effort was spent, field of employment, professional grade of employment, and geographic location were other cogent items used as gauges in the comprehensive study.

The general results showed that the median-income engineer does fairly well today, that a good number do very well moneywise, and that, as in other professions, there are quite a few men in the field whose abilities command storybook incomes.

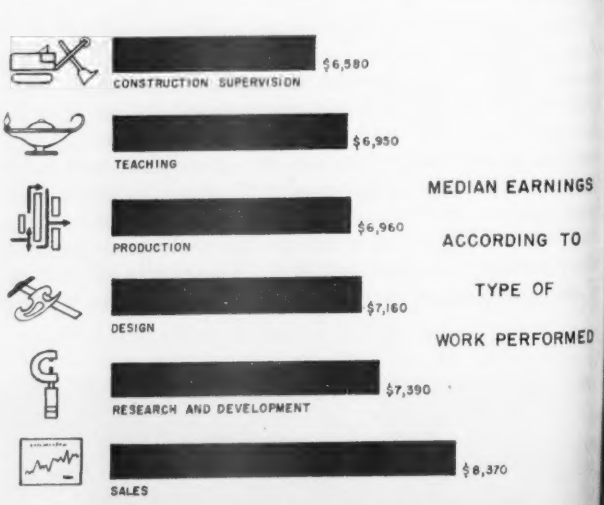
Ninety per cent of the engineers surveyed earned at least $5,120 in 1952; 75 per cent, at least $6,140; 50 per cent, at least $7,850; 25 per cent, at least $10,980; and 10 per cent, at least $17,190.

Nearly three-fourths of the 12,443 respondents to the NSPE questionnaire lived and worked in the Middle Atlantic, Middle Western, and New England states. This result was not unexpected since these three areas have long been the most highly urbanized in the United States. Yet the approximately 2,700 replies from the South and Southwest regions also testify to the much-heralded growth of industry in those areas, although the median salary in the latter region ($7,160) ranked second lowest according to geographic distribution. The lowest median ($6,810) was in the Plain States, while the highest ($8,630) belonged to the Northeast.

The engineers included in the study constituted a group of fairly wide experience. Two-thirds reported more than 12 years of professional experience. Fifty-five per cent of the 12,443 had entered the profession before 1933, and 45 per cent since that date. The 1923-28 period saw the greatest number of respondents taking up their engineering careers, while the war years' drop in college enrollments was reflected particularly in the 1945-46 and 1947 entrance figures. Sixty-two per cent of the engineers replying began their careers between 1919 and 1940—a sharp drop in the 1941 statistics again indicating the military situation. World War I conditions may have had some minor bearing on the lower number of respondent entrants before 1919, but it is also safe to assume that fewer pre-1919 engineers replied simply because a good number have taken advantage of retirement.

MORE than one-third of the respondents worked in private industry; private practice and contracting work claimed 24 per cent (9 per cent in contracting); and 23 per cent worked for government agencies (only 5 per cent with the Federal Government). Civil, mechanical, and electrical engineering were the three branches most heavily represented in the study, with chemical, mining and metallurgical, and other fields of specialization farther down the list. Over one-third of the men held executive-administrative posts, while the next largest group (26 per cent) did design work. Then followed construction supervision, sales, research and development, production, and teaching, while the specific work of 7 per cent did not fit into any of these survey categories.

Coming to the consideration of the actual dollar statistics that the survey revealed, the monetary value of experience was, of course, obvious. Yet in scrutinizing income differentials, it was also obvious that years of experience alone did not guarantee financial success. Differences in the earnings of the younger men, while marked, were not unusually spectacular; but among the fully experienced groups the variations between the highest-paid and the lowest-paid fourths were quite striking, in no case being less than $6,010. And it is in such



clues that one must also read the influence of intangibles like personality, environment, drive, and talent, none of which can be measured statistically.

While chemical engineers did not figure in the three largest categories responding to the NSPE questionnaire, when incomes were considered according to branch, theirs was found to be the most satisfactory. The median 1952 income of the respondent chemical specialists was found to be $8,910, as compared with $8,730 for mining and metallurgical engineers, $8,600 for those of nonspecified branches, $8,250 for mechanical engineers, $7,940 for electrical engineers, and a $7,390 median for civil engineers. In the upper tenth, too, the chemical engineers earned at least $19,950 in 1952; those in the upper tenth of the miscellaneous group earned at least $19,670; and mining and metallurgical specialists received $19,350. Mechanical engineers in the upper tenth earned $18,720 or more, while here the civil engineering decile figure ($16,030) was slightly more than that for electrical engineers ($15,900).

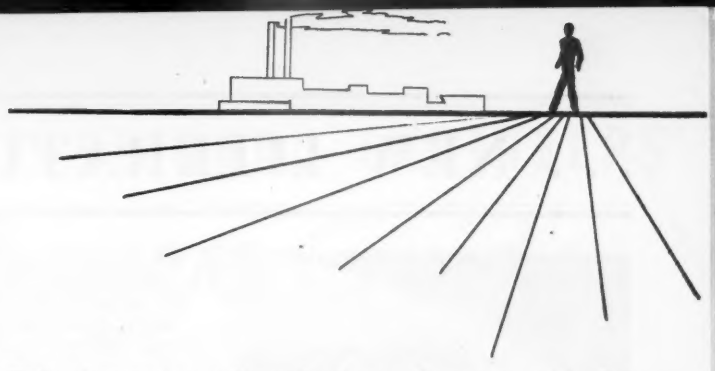
In addition to reflecting the well-known growth in importance of the chemical industry, the pecuniary preeminence of the chemical engineers gives rise to some interesting speculations occasioned particularly by the warnings of such eminent persons as Vannevar Bush (himself an engineer). Dr. Bush has stated more than once that the man, such as the chemist, engaged in the field of pure science can much more readily and easily take the step into the field of applied engineering than the engineer or other applied scientist can grasp the principles and bridge the gap into the field of pure scientific research. In a day when science and technology have become so complex, when a knowledge of the methods and concepts of both pure and applied science is so often essential, Dr. Bush has warned that the engineer may find himself edged out of his field unless he himself takes steps to insure the necessary adjustments in background, training, and general outlook. In the light of this thesis, the favored position of the chemical engineer becomes doubly interesting.

Studying the NSPE returns by field of employment, it was found that the highest incomes were earned by contractors ($9,920 median) and engineers in private practice ($9,690 median). In the upper quartile and upper decile figures, the private consultants showed a slight advantage over the contractors—in the upper fourth bracket earning more than $15,720 against $15,310 for the contractors, with the upper decile figure being $26,660 for the private practitioners against $25,670 for contractors.

SELF-EMPLOYMENT is, of course, no guarantee of high income; and it might be pointed out here that one reason why this, and numerous other surveys, find the independent professional practitioner so well off is that the respondents in this category are only those who have survived the economic perils of "going it alone." Those who have tried independent work and fallen by the wayside are not counted; the submarginal men in the independent field do not last long enough to become statistics.

Following those in independent work, it was no surprise to find engineers in industry coming next, with the median man earning $8,420; while enginering educators nosed out their compatriots in public utilities, $7,590 to $7,400 in the median salaries, although they fell somewhat behind in the upper quartile and upper decile.

Federal, county or municipal, and state government salaries came next in that order—also the reason that the incomes of civil engineers rank less than those of their colleagues in other branches. Despite the fact that the NSPE survey returns gave the edge to employees of the Federal Government, the recent leak to the press of a semi-secret basic wage and salary document compiled by four



Federal agencies indicated salary advantages with the secondary governments at least for beginners in the "junior civil engineer" category. The NSPE figures, however, as has already been noted, encompassed by and large a more experienced group, and the government sample was by no means all-inclusive.

Analyzed according to the type of work performed, incomes of the engineers surveyed were highest among those who performed executive-administrative duties ($9,930 median and $25,340 upper decile). Sales work was next ($8,370 median and $20,980 upper decile), followed by research and development ($7,390 median), design ($7,160), production ($6,960), teaching ($6,950), and construction supervision ($6,580).

Income data derived from the survey on the basis of years of experience again gave the advantage to the engineer-administrators and those in sales. Half of these men with 15 or more years of experience had five-figure incomes; but in all other types of jobs, most engineers, no matter how extensive their experience, earned less than $10,000 in 1952. And, of course, here it should be noted that most self-employed men would consider themselves in the executive-administrative classification.

FOR purposes of the survey, NSPE established eight grades of engineering work, ranging from "pre-professional" routine tasks under close supervision to direction, with final administrative authority, of large engineering organizations. The fifth grade established—including work performed by such as project engineers, senior resident engineers, senior research engineers, assistant division heads, etc.—was found to be the dividing line, as median, upper quartile, and upper decile earnings increased rapidly in the three top grades.

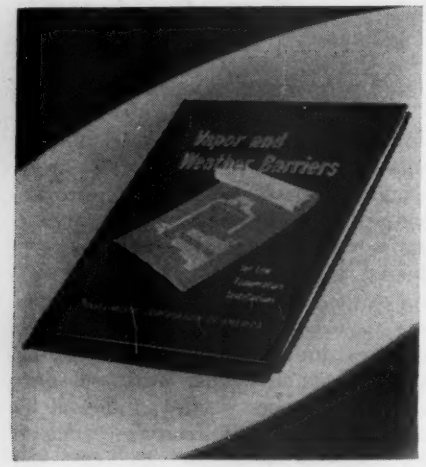
In analyzing statistical data it is all too easy to draw challengeable conclusions. In many ways, each man must draw his own interpretations according to his own lights and experience. Statistics can give him a lot of information, can indeed become tools which he can employ for his own benefit and advancement; but they cannot do one iota of his work for him.

Nor can any set of statistics be regarded as completely indicative of the whole picture. Yet as the science of statistics itself becomes more refined, statistical data become even more useful. It was not too long ago when most income studies recognized only two categories of persons —the "entrepreneurs" and the "workers." The breakdown by field and profession now in vogue gives a much clearer insight to the current industrial pattern and, indeed, to the nationwide economic status. Thus it has been the hope of the National Society of Professional Engineers that the information supplied through its income and salary survey would prove useful in many and various ways.

In 1870 there was only one engineer for every 2,000 persons in the nation's work force. By 1950 there was one for every 160. The assessment of the engineering profession's income status is, therefore, an important item in the over-all study of twentieth-century America which, with its emphasis and reliance on technology, is certainly the land of the engineer.—*End.*

# . . . NEW LITERATURE . . .

***To help the offering firms determine which literature you require, when requesting an item, be sure to list all specifications shown . . . and say you saw it in the AMERICAN ENGINEER.***




VAPOR BARRIER BOOK—Complete recommendations for vaporsealing insulation on low temperature vessels are given in an 80-page, edition-bound volume just published by the Insul-Mastic Corporation of America. The book, entitled "Vapor and Weather Barriers for Low Temperature Installations," contains fifty-four illustrations showing exactly where and how a vaporseal coating should be applied over thermal insulation to prevent deterioration of the insulation and resting of the vessel beneath it due to moisture and moisture vapor. It discusses and illustrates the vaporsealing of every chemical vessel detail from tanks and pipes to valves and flanges. Write: The Insul-Mastic Corporation of America, 1141 Oliver Building, Pittsburgh 22, Pennsylvania.

—AE—

**NEW SERVICE TOOL GUIDE — A completely new, 52-page Service Tool Guide for all GMC gasoline and diesel-powered trucks, both light and heavy duty, has just been released by the Kent-Moore Organization, Inc. Designed to help the truck service man find the special service tool he requires to do any job in the shortest time with the least amount of effort, this illustrated Guide contains descriptions of tools and their applications that are recommended for every service operation. Write: Advertising Department, Kent-Moore Organization, Inc., 5-105 General Motors Building, Detroit 2, Michigan.**

—AE—

*CORROSION RESISTANCE OF STAINLESS TUBULAR PRODUCTS — A new folder, designed to assist engineers involved in the selection of stainless tubing and pipe for corrosion resistance applications, has been issued by the Tubular Products Division of The Babcock & Wilcox Company.*

*Bulletin TDC 160 contains information on the comparative corrosion resistance of stainless steels to corrosive media. It presents pertinent data on six widely used stainless tubing steels and several hundred corrosive media at various temperatures and concentrations. Write: The Tubular Products Division of The Babcock & Wilcox Company, Beaver Falls, Pa.*

PLASTICS TABLES—A series of tables giving chemical and physical properties of fifteen different plastics has been compiled and is now available from the Atlas Mineral Products Co., Mertztown, Pa.

—AE—

**TRANSMISSION BELT SPLICING HANDBOOK — A 32-page, illustrated handbook on how to splice rubber transmission belts by means of the Plylock belt joint has just been published by The B. F. Goodrich Company, Akron, Ohio. Copies may be obtained free of charge upon request received on company letterhead.**

**The BFG Plylock belt joint is said to end separation by creating a strong yet flexible joint without butted outside plies that open at the surface and gradually pull apart.**

**The new handbook tells how to make the Plylock splice, lists tools and material required and tells how to assemble the splice on the drive. A section devoted to splicing instructions describes and illustrates the procedure for stepping down belt ends, cementing and applying tie-gum, assembling fill-in material and vulcanizing the splice. Each step is illustrated by photographs. Special instructions included for splicing folded edge belts, spindle belts and belts which operate on limited or no-take-up drives. Also featured is a series of convenient tables for figuring endless belt lengths and the time required to vulcanize belting of various thicknesses and types.**

—AE—

*KAISER STEEL CATALOG—Kaiser Steel Corporation announces the publication of a new 340-page General Catalog, which contains 117 pages of general technical information and reference tables, in addition to complete information on the Company's iron and steel products. It is offered on a limited basis to Western engineers, architects and manufacturers. Write: Kaiser Steel Corporation, 1924 Broadway, Oakland, Calif.*

**WELDING SAFETY FILM**

**Air Reduction has just produced a new sound slide-film on safety in the use of oxyacetylene cutting and welding equipment. The film, "The Guy Behind Your Back," is a fundamental approach to the factors affecting safety when operating oxyacetylene welding and cutting torches and cutting machines. It is specifically designed for employee training. It is a light, but not comic, approach planned to make the serious business of safety in welding easy to absorb.**

**Free showings of this 20 minute film may be arranged for by getting in touch with the Air Reduction office in your vicinity. Additional information may be obtained by writing Air Reduction Sales Company, 60 East 42nd Street, New York 17, New York.**

**PHOTOCOPY INFORMATION KIT—The American Photocopy Equipment Company, manufacturer of the Apeco Systematic Auto-Stat, has just compiled a new complete photocopy information kit. This kit has been prepared to give the busy executive the important information he needs to solve every copying problem in his business. It contains separate folders devoted to the following important new developments in the photocopy field: 1. How to use photocopying to prepare tax returns . . . showing how you can save time and eliminate errors in the preparation of tax returns; 2. How to photocopy in any color . . . showing how to color-code copies for greater business efficiency; 3. How to photocopy on pre-printed business forms . . . showing a number of important new applications to decrease paper handling. Write: American Photocopy Equipment Company, 1920 W. Peterson, Chicago 26, Illinois.**

—AE—

PYROMETER CATALOG—Pyrometer Instrument Co., Inc., announces the publication of a new Catalog, No. 85, which gives detailed information on the PYRO Optical Pyrometer and features technical information on the principles of Optical Pyrometry, illustrations of applications and other interesting data. Write: The Pyrometer Instrument Co., Inc., Bergenfield, N. J.

—AE—

**CONTROL UNIT BULLETIN—A new catalog sheet describing the MRC-21 Strain Gage Control Unit has been announced by Hathaway Instruments Co.**

**This instrument, together with the strain gages and a recording oscillograph is a complete strain-measuring laboratory suitable for the determination of both static and dynamic strain in mechanical members of all kinds. An important new feature is provision for automatic calibration of the entire system any time, merely by pressing a button, and channels can be calibrated at different values of strain. Write: Hathaway Instrument Co., 1315 S. Clarkson St., Denver 10, Colo.**

*your key to better buying*

# PROFESSIONAL ENGINEERS' Buyers Guide

**NOTE: The listed firms offer specialized items of particular interest to Registered Professional Engineer buyers. Those firms listed directly under a major heading deal in general products or services under that heading. The italics list specialties of the firm listed immediately under the italics.**

**ADDING MACHINES**
Remington Rand, Inc.
315 Fourth Ave.
New York 10, N. Y.

**AERIAL SURVEYS**
Aero Service Corp.
236 E. Courtland St.
Philadelphia 20, Pa.

Fairchild Aerial Surveys, Inc.
30 Rockefeller Plaza
New York, N. Y.

**AIR CONDITIONERS**
Airtemp Construction Corp.
Subsidiary of Chrysler Corp.
1600 Webster St.
Dayton 1, Ohio

Double-Kaye Co.
460 West Broadway
New York, N. Y.

Westinghouse
Air Conditioning Division
Hyde Park 36, Mass.

**ALARMS, COMBUSTIBLE GAS**
Johnson-Williams, Ltd.
2625 Third
Palo Alto, Calif.

**ALUMINUM**
***Strip, all kinds in thin gauges, close tolerances***
American Silver Company, Inc.
36-07 Prince St.
Flushing 54, N. Y.

**AMMONIA PLANTS**
Thomas Gas Contractors, Inc.
P. O. Box 270
Westfield, N. J.

**AMMONIA STORAGE PLANTS**
Pittsburgh-Des Moines Steel Co.
3470 Neville Island
Pittsburgh 25, Pa.

**AMPLIFIERS, CARRIER FREQUENCY**
Electronic Engineering Associates, Ltd.
1040 Brittan Ave.
San Carlos, Calif.

**ANEMOMETERS**
Beckman & Whitley, Inc.
990 E. San Carlos Ave.
San Carlos, Calif.

**ARCHITECTS SUPPLIES**
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

L. L. Ridgway Co., Inc.
615 Caroline St.
Houston 1, Texas

**ARCHITECTS SUPPLIES (Cont.)**
***Acrolite-Acrylic Spray***
***Acrolite-Matte***
***Artists fixative products packed in 12 oz. pressure spray containers. Used for protecting drawings, papers, charts, maps, etc.***
Acrolite Products, Inc.
84 West Jersey St.
Elizabeth, N. J.

***Space Scale***
***Space measurement and mathematical computation***
Dillon & Co.
22074 Elmwood Ave.
East Detroit, Mich.

**ARTISTS MATERIALS**
Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

***Acrolite-Acrylic Spray***
***Acrolite-Matte***
***Artists fixative products packed in 12 oz. pressure spray containers. Used for protecting drawings, papers, charts, maps, etc.***
Acrolite Products, Inc.
84 West Jersey St.
Elizabeth, N. J.

***VEMCO Drawing Instruments***
V. & E. Manufacturing Co.
P. O. Box 950 M
Pasadena, Calif.

**ATOMIC AND GEOPHYSICAL PROSPECTING INSTRUMENTS**
***Geiger Counters***
***Scintillation Counters***
***U-V Lights***
***Electronic Metal Detectors***
***Dip Needles***
***Magnetometers***
The Radiac Company, Inc.
489 Fifth Ave.
New York 17, N. Y.

**AUDIO SYSTEMS**
***Institutional, Carrier-frequency***
K-F Development Co.
2606 Spring St.
Redwood City, Calif.

***Roll Call Systems for Legislative Assemblies***
***Project count on reflectorized screen***
North American Signal Co.
6210 Massachusetts Ave.
Washington 16, D. C.

**AUTOMATIC TESTERS, ELECTRICAL AND ELECTRONIC CIRCUIT**
Color Television, Inc.
973 San Carlos Ave.
San Carlos, Calif.

**AUTOMOBILE ACCESSORIES**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

***Mechanical & velocity governors for all types of gasoline engines***
Hoof Products Co.
6543 S. Laramie Ave.
Chicago 38, Ill.

**BALL BEARINGS**
Aetna Ball and Roller Bearing Co.
4600 Schubert Ave.
Chicago 39, Ill.

The Federal Bearings Co., Inc.
Poughkeepsie, N. Y.

New Departure
Division of General Motors Corp.
Bristol, Conn.

**BATHROOM EQUIPMENT**
Double-Kaye Co.
460 West Broadway
New York, N. Y.

**BATTERIES, STORAGE**
Thomas A. Edison, Inc.
Edison Storage Battery Division
West Orange, N. J.

**BELTING, MACHINERY**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

**BOILERS**
Double-Kaye Co.
460 West Broadway
New York, N. Y.

Hickman Engineering Co.
420 Market St.
San Francisco 11, Calif.

***Boilers, fuel burning and related equipment for all steam requirements of utilities, industrial plants, institutions, and large buildings***
Combustion Engineering, Inc.
200 Madison Ave.
New York 16, N. Y.

***Boiler Settings***
Nyland Corporation
489 Fifth Ave.
New York, N. Y.

# PROFESSIONAL ENGINEERS' BUYERS GUIDE

**BOILER ACCESSORIES**

***Traps, steam and air***
***Temperature and pressure regulators***
***Desuperheaters***
***Floats***

Hickman Engineering Co.
420 Market St.
San Francisco 11, Calif.

**BOOKS**

***Medical, scientific, technical***

Engineer's Book Service
E. B. S. Inc.
3025 Avenue J.
Brooklyn 10, N. Y.

***Scientific, technical***

John Wiley & Sons, Inc.
440 Fourth Ave.
New York 16, N. Y.

**BUILDING MATERIALS**

The U. S. Stoneware Co.
Box 350
Akron 9, Ohio

***Cementrol, a reagent for controlling the setting time, strength and plasticity of cement mixes***
***Hardenite, a chemical reagent for surface hardening cement floors***
***Vaportite, an exterior finish and waterproofing for concrete structures***

Allied Compositions Co., Inc.
11-15 44th Road
Long Island City 1, N. Y.

***Corruform, Cofar, Roof Deck Steel Products for the Building Industry***

Granco Steel Products Co.
P. O. Box 221
Granite City, Illinois

***VERSABAR***

M-H Standard Co.
515 Communipaw Ave.
Jersey City 4, N. J.

***Transparent scale model buildings***

Mill Engineering Co.
Fort Wayne, Ind.

**CAMERAS**

***Ballistic, High-speed Timing***

Beckman & Whitley, Inc.
990 E. San Carlos Ave.
San Carlos, Calif.

***Hulcher 70***
***70 mm high speed sequence camera***

Charles A. Hulcher Co., Inc.
40 Manteo Ave.
Hampton, Va.

**CAST IRON PIPE**

United States Pipe and Foundry Co.
3300 First Ave., North
Birmingham 2, Ala.

**CASTINGS**

Carver Pump Co.
1056 Hershey Ave.
Muscatine, Iowa

***Stainless Steel Castings***

Allegheny Ludlum Steel Corp.
Henry W. Oliver Bldg.
Pittsburgh 22, Pa.

**CASTINGS (Cont.)**

***Precision Castings***

International Nickel Co., Inc.
67 Wall St.
New York 5, N. Y.

**CHAIN**

***Power Transmission and Sprockets***
***Roller, Silent & Conveyor Chain***

Whitney Chain Co.
554 Deering Rd., N. W.
Atlanta, Ga.

**CHEMICAL FEEDERS**

***Liquifeeder***
***Constant Flow Feeders***

Hankison Corp.
109 Biltmore Bldg.
951 Banksville Rd.
Pittsburgh 16, Pa.

**CHEMICALS**

Dorn & Co.
719 S. McClellan Ave.
Decatur, Ill.

Sharples Chemicals, Inc.
1100 Widener Bldg.
Philadelphia 7, Pa.

United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

***Benzol, Toluol, Xylol, Solvent Naphtha, Naphthalene, Creosote, Pitches, Carbon***

Portland Gas & Coke Co.
Public Service Bldg.
920 S. W. Sixth Ave.
Portland 4, Ore.

***Pumps & Supplies***

Nevada Pump & Supply Co.
412 South Fourth St.
Las Vegas, Nev.

**COILS, ELECTRONIC EQUIPMENT**

Western Coil Products
2995 Middlefield Rd.
Palo Alto, Calif.

**COMPARATORS, FLUORESCENCE**

Menlo Research Laboratory
P. O. Box 522
Menlo Park, Calif.

**CONCRETE DENSIFIER**

***Plastiment***

Sika Chemical Corp.
Passaic, N. J.

**CONTROLS**

***Level, Pressure, Temperature***

Leslie Co.
Lyndhurst, N. J.

***Linkages, Mechanical, Remote Cable-in-Conduit and Pushpull***

Teleflex Inc.
125 S. Main St.
North Wales, Pa.

***Electronic, Liquid Level***

Thermo Instruments Co.
1105 County Rd.
Belmont, Calif.

**CORROSION RESISTANT EQUIPMENT**

***Ceramics and Plastic***

The U. S. Stoneware Co.
Box 350
Akron 9, Ohio

**DETECTORS**

***Combustible Gas***

Johnson-Williams, Ltd.
2625 Third
Palo Alto, Calif.

***Fluorescence***

Menlo Research Laboratory
P. O. Box 522
Menlo Park, Calif.

**DIESEL ENGINES**

The BUDA Co.
154th & Commercial Ave.
Harvey, Ill.

**DRAFTING MATERIALS**

Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

L. L. Ridgway Co., Inc.
615 Caroline St.
Houston 1, Texas

Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.

***Bruning Drafting Machines***
***Circometric Drawing Machine***
***Curves & Templates***
***Drafting Instruments***
***Drafting Machine Scales***
***Drafting Room Furniture***
***Lettering Devices***
***Slide Rules***
***Straight Edges & T-Squares***

Charles Bruning Company, Inc.
4700 Montrose Ave.
Chicago 41, Ill.

***VEMCO Drafting Machines***

V. & E. Manufacturing Co.
P. O. Box 950 M
Pasadena, Calif.

**DRIERS**

***Rotary, Flash, LoTemp, Spray***

Crews Evaporator & Drier Co.
1111 South Alameda St.
Compton 3, Calif.

**DUPLICATOR SUPPLIES**

Remington Rand, Inc.
315 Fourth Ave.
New York 10, N. Y.

**DUPLICATORS**

***Copyflex Machines***
***Traveling, light vacuum frame***

Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

***Rex Rotary Duplicators***
***Twin-Cylinder Silk-Screen Mimeograph***

Rex Rotary Distributing Corp.
19 West 31st St.
New York 1, N. Y.

**EARTH MOVING EQUIPMENT**

Allis-Chalmers
Tractor Division
Milwaukee 1, Wis.

Bucyrus Erie Co.
South Milwaukee, Wis.

Caterpillar Tractor Co.
Peoria, Illinois

**EARTH MOVING EQUIP. (Cont.)**

Cleveland Trencher Co.
Cleveland 17, Ohio

Euclid Division
General Motors Corp.
Cleveland 17, Ohio

R. G. Le Tourneau, Inc.
Longview, Texas

***Tractor loaders***

The Eimco Corp.
Salt Lake City, Utah

***Back Hoes***
***Clamshells***
***Cranes***
***Draglines***
***Excavators, ⅜ yd., 5-6 ton***
***Magnet Cranes***
***Shovels***
***Truck and Crawler mounted Power Cranes***

Schield Bantam Co.
Park St.
Waverly, Iowa

**ELECTRIC MOTORS**

Fairbanks-Morse & Co.
Chicago 5, Ill.

General Electric Co.
Schenectady 5, N. Y.

Westinghouse Corp.
East Pittsburgh, Pa.

**ELECTRICAL EQUIPMENT**

***Potentiometers, precision***
***Resistors, precision***
***Audio Systems, institutional, carrier-frequency***

K-F Development Co.
2606 Spring St.
Redwood City, Calif.

**ELECTRICAL SUPPLIES**

United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

***pres-SURE-connectors***
***BUCHANAN Molded Terminal Blocks***
***BUSHEND Insulated Conduit Bushings***
***"SNAP-ACTION" Plugs***

Buchanan Electrical Products Corp.
216 U. S. Route 22
Hillside, N. J.

***Control Panels***
***Switchgear***
***Unit Substations***

Gustaveson, Inc.
8600 Chestnut St.
Kansas City 30, Mo.

***Blowers and Vacuum cleaners***
***Carbide & hand star masonry drills***
***Commutator stones and saws***
***Expansion bolts***
***Fish tapes and reels***
***Fuse clip clamps***
***Fuse reducers and pullers***
***Lathe live centers***
***Plastic clamps***
***Plastic screw anchors***
***Screw-on & set screw wire connectors***
***Toggle bolts***
***Voltage testers***
***Wire strippers***

Holub Industries, Inc.
413 DeKalb Ave.
Sycamore, Illinois

**ELECTRICAL SUPPLIES (Cont.)**

***VERSABAR***

M-H Standard Co.
515 Communipaw Ave.
Jersey City 4, N. J.

***Eletrical Porcelain***

The Universal Clay Products Co.
First Street
Sandusky, Ohio

**ELECTRONIC COMPUTERS**

Remington Rand Inc.
315 Fourth Ave.
New York 10, N. Y.

**ELECTRONICS**

Manning, Maxwell & Moore, Inc.
250 East Main St.
Stratford, Conn.

***Modular & PAKAP electronic computer components***

Audio Products Corp.
2265 Westwood Blvd.
Los Angeles, Calif.

***Electron Tubes***

Lewis and Kaufman, Ltd.
Los Gatos, Calif.

***Traffic Control Equipment***

Franklin P. Miller & Son, Inc.
36 Meadow Street
East Orange, N. J.

***Electronic controlled equipment***
***Liquid Level Controls***
***Photoelectric Controls***
***Timers, Electronic***

Photoswitch Inc.
77 Broadway
Cambridge 42, Mass.

**ELECTROPHORESIS APPARATUS**

Specialized Instruments Corp.
601 O'Neil Ave.
Belmont, Calif.

**ENAMELS, PAINT**

Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

**ENGINEERS SUPPLIES**

Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

Double-Kaye Co.
460 West Broadway
New York, N. Y.

Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

W. & L. E. Gurley
Troy, N. Y.

L. L. Ridgway Co., Inc.
615 Caroline St.
Houston 1, Texas

Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.

***Acrolite-Acrylic Spray***
***Acrolite-Matte***
***Artists fixative products packed in 12 oz. spray containers. Used for protecting drawings, papers, charts, maps, etc.***

Acrolite Products, Inc.
84 West Jersey St.
Elizabeth, N. J.

**ENGINEERS SUPPLIES (Cont.)**

***Space Scale***
***Space measurement and mathematical computation***

Dillon & Co.
22074 Elmwood Ave.
East Detroit, Mich.

**ENGINES**

***Gas***

The BUDA Co.
154th & Commercial Ave.
Harvey, Ill.

***Gas, Marine***

Cooper-Bessemer Corp.
Mount Vernon, Ohio

***Mechanical & velocity governors for all types of gasoline engines***

Hoof Products Co.
6543 So. Laramie Ave.
Chicago 38, Ill.

**EVAPORATORS**

***HMV (High Mass Velocity), Vertical, Horizontal, Forced Circulation, Atmospheric***

Crews Evaporator & Drier Co.
1111 South Alameda St.
Compton 3, Calif.

**FILING DEVICES**

Remington Rand, Inc.
315 Fourth Ave.
New York 10, N. Y.

**FILING EQUIPMENT**

Remington Rand, Inc.
315 Fourth Ave.
New York 10, N. Y.

L. L. Ridgway Co., Inc.
615 Caroline St.
Houston 1, Texas

***Hamilton Steel Sectional Cabinets***
***Hamilton Roll Tracing Units***
***Hamilton Steel Vertical Files***

Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

**FILTERS, AIR**

***Condensifilters***
***Compressed Air Filters***

Hankison Corp.
109 Biltmore Bldg.
951 Banksville Rd.
Pittsburgh 16, Pa.

**FLOORING**

***Coverings***

United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

***Duralon, a heavy duty wear-resistant plastic composition flooring***

Allied Compositions Co., Inc.
11-15 44th Road
Long Island City 1, N. Y.

***Underlayments: Cushionex, Flash "16", Lev-L-Astic, Superflash, Velvetred***
***These materials are all used as patching compounds and underlayments for smoothing concrete and wood floors prior to the installation of resilient floor coverings.***

Allied Compositions Co., Inc.
11-15 44th Road
Long Island City 1, N. Y.

**FRACTIONATING COLUMNS, LABORATORY GLASS**
Glass Engineering Laboratories
601 O'Neill Ave.
Belmont, Calif.

**FUEL GAS ODORANTS**
Sharples Chemicals, Inc.
1100 Widener Building
Philadelphia 7, Pa.

**FURNACES, INDUSTRIAL**
***Pusher, rotary, car, batch***
George J. Hagan Co.
2400 E. Carson St.
Pittsburgh, Pa.

**GALVANIZING**
***"Galvicon" Cold Galvanizing***
Galvicon Corp.
40 West 29th St.
New York 1, N. Y.

**GENERATORS**
***Electric, Miniature***
Dalmotor Co.
1375 Clay St.
Santa Clara, Calif.

***Ultraviolet***
Menlo Research Laboratory
P. O. Box 522
Menlo Park, Calif.

**GERMICIDES**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

***Ultra-Violet Germicidal Equipment***
D. William Fuller Co.
2320 East 75th St.
Chicago 49, Ill.

***Weed Killing Oils***
Portland Gas & Coke Co.
Public Service Bldg.
920 S. W. Sixth Ave.
Portland 4, Ore.

**GRAPHITES**
Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

**GREASES**
Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

**HEAT TREATING AND BRAZING**
Eastern Heat Treating & Brazing Corp.
250 West 54 Street
New York 19, N. Y.

**HOSE**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

***Flexible metal***
Atlantic Metal Hose Co., Inc.
308 Dyckman St.
New York 34, N. Y.

***Hose, Hose Fittings & Assemblies for hydraulic, fuel & oil uses***
Stratoflex, Inc.
Box 10398
Ft. Worth 14, Texas

**HYDRAULIC EQUIPMENT**
***Tube Fittings, Cylinders, Couplers, Hose, Valves***
Production Service Company
7413 Memphis Ave.
Cleveland 9, Ohio

**HYGIENIC INSTRUMENTS**
***Ultra-Violet Germicidal Equipment***
D. William Fuller Co.
2320 East 75th St.
Chicago 49, Ill.

**INCINERATORS**
Nyland Corporation
489 Fifth Ave.
New York, N. Y.

**INDICATORS**
***Temperature***
Beckman & Whitley, Inc.
990 E. San Carlos Ave.
San Carlos, Calif.

***Voltage Standing-Wave Ratio***
Color Television Inc.
973 San Carlos Ave.
San Carlos, Calif.

***Combustible Gas***
Johnson-Williams, Ltd.
2625 Third
Palo Alto, Calif.

***Electronic, Liquid Level***
Thermo Instruments Co.
1105 County Rd.
Belmont, Calif.

**INK**
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

**INSECTICIDES**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

***Creosotes, Aromatic Distillates***
Portland Gas & Coke Co.
Public Service Bldg.
920 S. W. Sixth Ave.
Portland 4, Ore.

**INSTRUMENT AND APPARATUS TRANSIT CASES**
Engineered Instruments
815 Soto St.
Hayward, Calif.

**INSTRUMENTATION PANELS**
Gustaveson, Inc.
8600 Chestnut Street
Kansas City 30, Mo.

**INSTRUMENTS, METEOROLOGICAL**
Beckman & Whitley, Inc.
990 E. San Carlos Ave.
San Carlos, Calif.

**INSULATION**
Johns-Manville
New York 16, N. Y.

**INSURANCE**
***Power Plant Insurance & Inspection***
***Boiler and Machinery Insurance***
Mutual Boiler and Machinery Insurance Co.
60 Batterymarch St.
Boston, Mass.

**IRRIGATION EQUIPMENT**
***Centrifugal Pumps***
***Industrial, construction, irrigation***
Carver Pump Co.
1056 Hershey Ave.
Muscatine, Iowa

***Pumps & Supplies***
Nevada Pump & Supply Co.
412 South Fourth St.
Las Vegas, Nev.

**LABORATORY APPARATUS, GLASS**
Glass Engineering Laboratories
601 O'Neill Ave.
Belmont, Calif.

**LAWN SPRINKLERS**
***Under Ground Lawn Sprinkling Equipment***
***Buckner Sprinklers***
A. J. Miller, Inc.
2337 W. McNichols
Detroit, Mich.

**LEVELS**
Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

W. & L. E. Gurley
Troy, New York

Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.

***Brunson Levels***
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Illinois

**LIGHTING APPLIANCES**
***Fixtures for institutional & commercial use***
Gruber Brothers, Inc.
125 S. First St.
Brooklyn 11, N. Y.

***Fluorescent, specialty***
Stocker & Yale, Inc.
Marblehead, Mass.

***Acusti Luminus Ceilings***
***Area illumination, even light distribution, eliminates noise and glare***
Stuart Owen Sales
15 Vose Ave.
South Orange, N. J.

**LIQUEFIED PETROLEUM GAS PLANTS**
Thomas Gas Contractors, Inc.
P. O. Box 270
Westfield, N. J.

**LUBRICANTS**
Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

***Molly-sulfide***
***Solid-film lubricant for extreme conditions***
Climax Molybdenum Co.
500 Fifth Ave.
New York 36, N. Y.

**MACHINERY**
Mannesmann-Meer Engineering & Construction Co., Inc.
900 Line St.
Easton, Pa.

The U. S. Stoneware Co.
Box 350
Akron 9, Ohio

***Sleeves Gortite***
***Neoprene protective boots for machinery***
A & A Mfg. Co.
2017 W. Clybourne St.
Milwaukee 3, Wis.

***Presses, lathes and other production equipment***
The Gute Co.
606 W. Wisconsin Ave.
Milwaukee 3, Wis.

**MACHINERY (Cont.)**
***Materials Handling***
Kornylak Engineering Corp.
518 Communipaw Ave.
Jersey City 4, N. J.

***Dry Ice Crushers, Crushing machinery, Ice Breakers***
Franklin P. Miller & Son, Inc.
36 Meadow St.
East Orange, N. J.

***Earth moving***
Schield Bantam Co.
Park St.
Waverly, Iowa

***Spar Mills, Skin Mills, Drills, Etc. Machine Tools for Aircraft Industry***
Wiesner Rapp Co., Inc.
1600 Seneca St.
Buffalo 10, New York

**MAPS**
***Photo, Topographic***
Aero Service Corp.
236 E. Courtland St.
Philadelphia 20, Pa.

***Aerial***
Fairchild Aerial Surveys, Inc.
30 Rockefeller Plaza
New York, N. Y.

**MATERIALS HANDLING**
***Bulk materials handling equipment Design, engineer, manufacture & erect***
Beaumont Birch Co.
1505 Race St.
Philadelphia 2, Pa.

***Special machinery and equipment***
Kornylak Engineering Corp.
518 Communipaw Ave.
Jersey City 4, N. J.

***Hydrolift Straddle Stacker***
Lift Trucks, Inc.
2423-2431 Spring Grove Ave.
Cincinnati 14, Ohio

***Armorbelt, Mono-Flo, Saniscrew, Versabar***
M-H Standard Co.
515 Communipaw Ave.
Jersey City 4, N. J.

***Conveyors***
Franklin P. Miller & Son, Inc.
36 Meadow St.
East Orange, N. J.

***Conveyors, overhead and floor type***
Jervis B. Webb Co.
8951 Alpine Ave.
Detroit 4, Mich.

***Hand Trucks, powered***
Revolvator Co.
8782 Tonnele Ave.
North Bergen, N. J.

***Flotation Machines***
***Minerals-Flotation***
Rogers & Sons
910 Washington Bldg.
Washington, D. C.

**MATERIALS TESTING**
Bowser-Morner Testing Laboratory
P. O. Box 51
Dayton 1, Ohio

**MEASURING EQUIPMENT, DYNAMIC PRESSURE**
Electronic Engineering Associates, Ltd.
1040 Brittan Ave.
San Carlos, Calif.

**MECHANICAL RUBBER GOODS**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

**MECHANISMS AND DEVICES, EXPLOSIVE-ACTUATED**
Beckman & Whitley, Inc.
990 E. San Carlos Ave.
San Carlos, Calif.

**MEDICAL INSTRUMENTS, ELECTRONIC**
Levinthal Electronic Products, Inc.
2821 Fair Oaks Ave.
Redwood City, Calif.

**METAL STRIPS**
***All kinds, thin gauges, close tolerances***
American Silver Company, Inc.
36-07 Prince St.
Flushing 54, N. Y.

**METALLIC BELLOWS ASSEMBLIES**
Eastern Metals Industries, Inc.
250 West 54 St.
New York 19, N. Y.

**METALLIC COATINGS**
Galvicon Corp.
40 West 29th St.
New York 1, N. Y.

**MOTOR TRUCKS**
***Mechanical & velocity governors for all types of gasoline engines***
Hoof Products Co.
6543 S. Laramie Ave.
Chicago 38, Ill.

**MOTORS**
***Electric, Miniature***
Dalmotor Co.
1375 Clay St.
Santa Clara, Calif.

**OFFICE FURNITURE**
Remington Rand, Inc.
315 Fourth Ave.
New York 10, N. Y.

***Fine furniture for both home and office. Consulting decoration and design services***
Kahn Associates
Interior Decorators, Designers
1141 President Street
Brooklyn 25, N. Y.

**OFFICE SUPPLIES**
Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

Remington Rand, Inc.
315 Fourth Ave.
New York 10, N. Y.

**OIL BURNERS**
Double-Kaye Co.
460 West Broadway
New York, N. Y.

**OPTICAL GOODS**
***Lenses, Mirrors, Prisms***
Optical Specialties, Inc.
1135 S. Birmingham
Tulsa, Oklahoma

***Industrial Optical Instruments***
Stocker & Yale, Inc.
Marblehead, Mass.

**OVENS**
Double-Kaye Co.
460 West Broadway
New York, N. Y.

**OXYGEN THERAPY ALARM PANELS**
Gustaveson, Inc.
8600 Chestnut St.
Kansas City 30, Mo.

**PACKING MATERIAL**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

**PAINTS**
Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

Dorn & Co.
719 S. McClellan Ave.
Decatur, Ill.

Galvicon Corp.
40 West 29th St.
New York 1, N. Y.

The U. S. Stoneware Co.
Box 350
Akron 9, Ohio

**PAVING MATERIALS**
***KOMAC patching and paving premix***
Koppers Co., Inc.
Tar Products Div.
Pittsburgh 19, Pa.

***Road Tars, Road Tar Solvents***
Portland Gas & Coke Co.
Public Service Bldg.
920 S. W. Sixth Ave.
Portland 4, Oregon

**PENCILS**
Joseph Dixon Crucible Co.
Wayne & Monmouth Sts.
Jersey City, N. J.

Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

***China Marking & Charcoal Pencils, Colored Pencils, Drawing Pencils & Leads, Multikolor Pencils***
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

**PENS**
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

**PHOTO EQUIPMENT**
***Stroborex Photo Flash***
***Electronic Photo Flash***
Continental Electronics Corp.
12238 Santa Monica Blvd.
Los Angeles 25, Calif.

**PHOTOCOPYING**
***Apeco Auto-Stat***
American Photocopy Equipment Co.
2849 North Clark Street
Chicago 14, Ill.

***CONTOURA Portable Photo-copier***
***CONSTAT Portable Dry Processor***
***Copies printed, written, typed or drawn matter***

F. G. Ludwig, Inc.
Deep River, Conn.

**PIPE**
Double-Kaye Co.
460 West Broadway
New York, N. Y.

***Aluminum***
Aluminum Company of America
Alcoa Bldg.
Pittsburgh 19, Pa.

**PLASTICS**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

The U. S. Stoneware Co.
Box 350
Akron 9, Ohio

***Custom moulded plastics and standard knobs***
Kurz-Kasch Inc.
1421 S. Broadway
Dayton 9, Ohio

***SPONGEX cellular plastic***
***Expanded unicellular polyvinyl chloride***
The Sponge Rubber Products Co.
601 Derby Place
Shelton, Conn.

**PLUMBING ACCESSORIES**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

***Fixtures***
Double-Kaye Co.
460 West Broadway
New York, N. Y.

**PNEUMATIC TIRES & TUBES**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

**POTENTIOMETERS, PRECISION**
K-F Development Co.
2606 Spring St.
Redwood City, Calif.

**PRECISION INSTRUMENTS**
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

W. & L. E. Gurly
Troy, N. Y.

Manning, Maxwell & Moore, Inc.
250 East Main St.
Stratford, Conn.

Stocker & Yale, Inc.
Marblehead, Mass.

Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.

***LEVELALL***
***Precision leveling instrument***
Levelall
81 Webster St.
Rockland, Mass.

**PRESSURE VESSELS**
Thomas Gas Contractors, Inc.
P. O. Box 270
Westfield, N. J.

**PUMPS**
Double-Kaye Co.
460 West Broadway
New York, N. Y.

**PUMPS (Cont.)**
***Centrifugal Pumps***
***Industrial, construction, irrigation***
Carver Pump Co.
1056 Hershey Ave.
Muscatine, Iowa

***CENTRI-THRIFT and other centrifugals***
***Quality performance in liquid transfer***
The F. E. Meyers & Bro. Co.
Ashland, Ohio

***Pumps & Supplies***
Nevada Pump & Supply Co.
412 South Fourth St.
Las Vegas, Nev.

**RADAR ANTENNAS**
Dalmo Victor Co.
1414 El Camino Real
San Carlos, Calif.

**RADIO DIRECTION FINDERS, MARINE**
Applied Electronics Co.
1246 Folsom St.
San Francisco, Calif.

**RADIO PARTS**
***Powdered Iron Cores for radio and television***
Radio Cores, Inc.
9540 S. Tulley
Oak Lawn, Ill.

**RADIO TELEPHONES, MARINE**
Applied Electronics Co.
1246 Folsom St.
San Francisco, Calif.

**RADIOMETERS**
***Total-hemispherical***
***Net-exchange***
Beckman & Whitley, Inc.
990 E. San Carlos Ave.
San Carlos, Calif.

**RADIATORS**
Double-Kaye Co.
460 West Broadway
New York, N. Y.

**REFRIGERATION**
Airtemp Construction Corp.
Subsidiary of Chrysler Corp.
1600 Webster St.
Dayton 1, Ohio

**RELAYS, PLATE-CIRCUIT**
Thermo Instruments Co.
1105 County Rd.
Belmont, Calif.

**RELAY UNITS**
***Radio fleet control***
Lectrolab Manufacturing Co.
P. O. Box 707
Palo Alto, Calif.

**RESISTORS, PRECISION**
K-F Development Co.
2606 Spring St.
Redwood City, Calif.

**ROLLER BEARINGS**
Aetna Ball and Roller Bearing Co.
4600 Schubert Ave.
Chicago 39, Ill.

Hyatt Bearings Division
General Motors Corp.
Harrison, N. J.

The Timken Roller Bearing Co.
Canton 6, Ohio

**RUBBER CEMENT**
United States Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

**SAFES**
Remington Rand, Inc.
315 Fourth Ave.
New York 10, N. Y.

**SCALES**
***Hopper scales for batching***
***Scales for every weighing purpose***
The Howe Scale Co.
Rutland, Vt.

**SCIENTIFIC INSTRUMENTS**
Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

Stocker & Yale, Inc.
Marblehead, Mass.

W. & L. E. Gurley
Troy, N. Y.

Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.

***Modular and PAKAP electronic computor components***
Audio Products Corp.
2265 Westwood Blvd.
Los Angeles, Calif.

***Atomic and Geophysical Prospecting Instruments***
***Dip Needles***
***Electronic Metal Detectors***
***Geiger Counters***
***Magnetometers***
***Scintillation Counters***
***U-V Lights***
The Radiac Co., Inc.
489 Fifth Ave.
New York 17, N. Y.

**SCREENS**
***Vibrating Screens***
Productive Equipment Corp.
2926 West Lake St.
Chicago 12, Ill.

**SCRUBBERS**
***Scrubbers, air and gas***
***Used for cleaning air and gas***
Oil Metering and Processing Equipment Corp.
4843 Yale St.
Houston 18, Texas

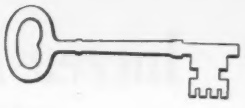
**SHOCK ABSORBERS**
U. S. Rubber Co.
1230 Avenue of the Americas
New York 20, N. Y.

**SLIDE RULES**
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

L. L. Ridgway Co., Inc.
615 Caroline St.
Houston 1, Texas

Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.



**SLIDE RULES (Cont.)**

***DEVCO Slide-Pen-Cyl Pencil Slide Rule***
Device Development Co.
226-A West 4th St.
New York 14, N. Y.

***Space Scale***
***Space measurement and mathematical computation***
Dillon & Co.
22074 Elmwood Ave.
East Detroit, Mich.

**SPECTROGRAPHS**

***Power Sources***
***Complete accessories for spectrographic laboratories***
National Spectrographic Sales Corp.
6300 Euclid Ave.
Cleveland 3, Ohio

**STEEL**

***Metal Strips, all kinds, thin gauges, close tolerances***
American Silver Co., Inc.
36-07 Prince St.
Flushing 54, N. Y.

***Complete commercial steel treating service***
The Lakeside Steel Improvement Co.
5418 Lakeside Ave.
Cleveland 14, Ohio

***Structural steel***
Allied Structural Steel Companies
20 No. Wacker Dr.
Chicago 6, Ill.

***Steel Grating***
Blaw-Knox Co.
Equipment Division
Pittsburgh, Pa.

***"Virginia" Open-web steel joist & reinforcing bars***
Virginia Steel Co., Inc.
3122 W. Cary St.
Richmond, Va.

**SURVEYING INSTRUMENTS**

Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

W. & L. E. Gurley
Troy, N. Y.

***Repairs, surveying instruments***
Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.

**SWEEPERS**

***Rotary sweepers***
Little Giant Products, Inc.
1530 No. Adams St.
Peoria 3, Ill.

**TANKS**

***Meter proving tanks used to prove positive displacement meters***
Oil Metering and Processing Equipment Corp.
4843 Yale Street
Houston 18, Texas

**TILING**

The U. S. Stoneware Co.
Box 350
Akron 9, Ohio

**TRACING CLOTH**

***Drawing Papers, cloth and film Sensitized and Translucent Papers***
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

L. L. Ridgway Co., Inc.
615 Caroline St.
Houston 1, Texas

**TRANSDUCERS, HEAT-FLOW**

Beckman & Whitley, Inc.
990 E. San Carlos Ave.
San Carlos, Calif.

**TRANSITS**

Geo-Optic Co., Inc.
170 Broadway
New York 38, N. Y.

W. & L. E. Gurley
Troy, N. Y.

Warren-Knight Co.
136 N. 12th St.
Philadelphia 7, Pa.

***Brunson Surveying Instruments***
Charles Bruning Co., Inc.
4700 Montrose Ave.
Chicago 41, Ill.

**TRUCKS**

***Hand, 2 and 4 wheel***
The Howe Scale Co.
Rutland, Vt.

**ULTRACENTRIFUGES**

Specialized Instruments Corp.
601 O'Neill Ave.
Belmont, Calif.

**VALVES**

***Nordstron Valves***
***For electric, hydraulic or pneumatic operation. Automatic, manual or remote controls***
Rockwell Manufacturing Co.
Pittsburgh 8, Pa.

***Regulating Valves***
Leslie Company
Lyndhurst, New Jersey

***Simplex Type AV Valve***
***Combination air release and air inlet valve***
Simplex Valve and Meter Co.
6724 Upland Street
Philadelphia 42, Pa.

**VENTILATORS**

Double-Kaye Co.
460 West Broadway
New York, N. Y.

**VORTEX TUBES, RANQUE-HILSCH**

Thermo Instruments Co.
1105 County Road
Belmont, Calif.

**WATER CONDITIONING**

The Permutit Co.
330 West 42nd St.
New York 36, N. Y.

**WATER CONTROL APPARATUS**

Brown & Brown, Inc.
Lima, Ohio

Rodney Hunt Machine Co.
86 Lake St.
Orange, Mass.

**WATERPROOFING**

***Dasco Dastite***
The Dasco Chemical Co., Inc.
1602-04 Thames St.
Baltimore 31, Md.

**WELL MACHINERY**

***Pumps & Supplies***
Nevada Pump & Supply Co.
412 South Fourth St.
Las Vegas, Nev.

**WINCHES, HAND**

Little Giant Products, Inc.
1530 No. Adams St.
Peoria 3, Ill.

**WIND-DIRECTION RECORDERS**

Beckman & Whitley, Inc.
990 E. San Carlos Ave.
San Carlos, Calif.

## RECEIVED TOO LATE TO CLASSIFY

**PRODUCTS MANUFACTURED BY CONSOLIDATED DIESEL ELECTRIC CORP.**

***Diesel and Gasoline Generator Sets***
***Aircraft Ground Power Servicing Equipment***
***Jet Aircraft Starting Units (Self-Propelled and Trailer Mounted)***
***Magnetic Sweepers, Self-Propelled***
***Floodlight Units***
***Switchboards***
***Hydraulic and Electric Test Stands***
***Engine Driven Air Compressors***
***Engine Driven Pumping Sets***
Consolidated Diesel Electric Corp.
Ludlow & Canal Sts.
Stamford, Conn.

**PRODUCTS MANUFACTURED BY HOWARD INDUSTRIES**

***Fractional HP Motors***
Howard Industries
1760 State St.
Racine, Wis.

**PRODUCTS MANUFACTURED BY R. G. LE TOURNEAU, INC.**

***Saws, Tree, land clearing, mobile, diesel-electric***
***Tractors, rubber-tired, diesel-electric, 4-wheel AC or DC electric drive, to 25 tons***
***Cranes, mobile, diesel-electric, to 100 tons***
***Transporters, rubber-tired, diesel-electric, 4-wheel DC electric drive, to 45 tons***
***Movers, Heavy, rubber-tired, diesel-electric, to 100 tons (houses, housing forms, oil derricks)***
***Trains, rubber - tired, trackless, diesel-electric, all-wheel electric drive (for off-road transport)***
***Ships, cargo, ocean-going, electric drive, multiple screw, shallow draft, 75 tons and up***
***Cranes, jib, to 15-ton capacity***
***Hoists, electric, AC, to 15-ton capacity***
***Winches, electric***
***Sawmills, circular, electric drive, portable***
***Motors, electric, AC, with bi-metallic friction brakes, for machine tool, cable drum and various industrial applications***
***Steel Plate, structural and boiler***
R. G. Le Tourneau, Inc.
Longview, Texas

# Increasing Use Made of National Certificates

By

**Frank H. Prouty, P.E., Chairman,**

***Committee on National Bureau of Engineering Registration***

DURING the past year an increasing number of registered engineers have found it desirable to obtain a certificate of qualification from the National Bureau. Since 80% of the states make use of such certificate, wholly or in part, many registered engineers crossing state lines find this certificate very helpful in expediting their new applications. Numerous engineers have written letters to Mr. Legaré of the National Council expressing appreciation for the assistance rendered through a National Certificate in obtaining multiple registration.

The inherent rights of each individual state to control and grant a professional license make it constitutionally impossible for any national agency to award a legal state license. A national agency can, however, accumulate and certify to facts regarding the professional record of any registered engineer. These statistical facts usually cover the following points:

1. Was the applicant registered by written examination or otherwise in his home state?
2. Verification of education and degrees.
3. Membership and grade held in Societies, Associations or Institutes.
4. Experience record with reference replies from at least five registered engineers.
5. Applicant's summary of (a) subprofessional, (b) professional, (c) responsible charge, and (d) design experience.
6. Secretary Legaré's report on verification of summary claimed by applicant.
7. Judgment by committee of NCSBEE as to whether applicant meets minimum qualifications for a national certificate.

The minimum qualifications for a national certificate exceed those of the Model Law. During the past year amongst applicants granted a certificate, the minimum age was 31 years and the average age was 46 years. The minimum experience for a graduate from an accredited school who had also passed a written examination was 11 years. The cash receipts from certificates granted last year was $5,202.00 as against $3,246.00 the previous year.

Each state pays a part of operating the head office of NCSBEE at Columbia, South Carolina, and in this way the national secretary is a paid employee of each State Board. As a paid employee the national secretary merely collects and compiles factual data on applicants who receive a national certificate. The judgment within any particular state of any person granted such a certificate rests entirely with the local State Board. Many states have a clause in the state law granting the State Board permission to accept all data compiled and presented by the National Bureau. Other states may make a partial acceptance only. No state law should prevent a Board from receiving and evaluating the factual evidence compiled by our national secretary.

WHEN a State Board desires a photostatic copy of confidential reference replies, the applicant pays the $5.00 fee and the national secretary sends the copies directly to the State Board.

Most engineers who reach a position of eminence find a demand for their services in more than one state. State lines should not hamper the practice of the especially qualified engineer nor should state lines prevent a client from obtaining the services of an out-of-state engineer particularly capable of performing any certain service. Registration laws are to protect the public from the incompetent engineers and to make it difficult if not impossible for the incompetent engineer to deceive the public regarding his true ability.

Once an engineer has proven his ability he should not be forced to submit proof of his education, character and ability every time he crosses a state line. The engineer should first prove that he merits registration, preferably in his home state.

The National Bureau will not consider anyone who is not already a registered engineer. When such an engineer feels that he has passed the minimum requirements set up in the model law and can meet the minimum requirements established by the National Bureau, he should not start again from scratch every time he passes over a state line, but should seek a National Certificate. The data accompanying a National Certificate should fully establish a man's age, education and sufficient experience so that a registered engineer holding such a certificate can enter into multiple state practice without the delay and embarrassment of contacting his references and other supporting data, over and over again. Photostatic copies of reference letters written to the National Council are confidentially obtainable without the necessity of again contacting the authors.

THE minimum requirements for a National Certificate are higher than the minimum requirements in some states. In such states, some engineers seek the personal satisfaction of holding a National Certificate.

Those familiar with the careful scrutiny given each applicant for a National Certificate realize that it is a badge of merit and such Certificate has grown in stature to where most states give it official recognition. That all states will eventually give it recognition within the purview of local state laws is the hope of the Committee of the National Bureau.

Applications for a National Certificate may be obtained from Mr. T. Keith Legaré, Secretary, P. O. Drawer 1404, Columbia, South Carolina. The fee charged by the National Council of State Boards of Engineering Examiners for a National Certificate is $35.00.—***End.***

**NSPE Spring Board Meeting**—February 18-20. Hilton Hotel, Albuquerque, New Mexico.

**Professional Engineers of North Carolina**—Annual Meeting. February 25-27. Washington-Duke Hotel, Durham, North Carolina.

**Georgia Society of Professional Engineers**—Annual Meeting. February 27.

**Ohio Society of Professional Engineers**—Annual Meeting. March 26, 27. Mayflower Hotel, Akron, Ohio.

**Illinois Society of Professional Engineers**—Annual Meeting. March 25-27. Broadview Hotel, East St. Louis, Illinois.

# A Listing of the State Registration Boards

**For the convenience of our readers, we are listing below the names and addresses of the various State Registration Boards. It is suggested that this issue of the American Engineer be filed so as to retain this information for future use.**

Alabama State Board of Registration for Professional Engineers and Land Surveyors
Clifton C. Cobb, Executive Secretary
609 Monroe Street, Montgomery, Alabama

Alaska Board of Engineers and Architects Examiners
Linn A. Forrest, Secretary
Box 251, Juneau, Alaska

Arizona State Board of Technical Registration
Mrs. Rayma Neeb, Executive Secretary
319 Arizona Title Bldg., Phoenix, Arizona

Arkansas State Board of Registration for Professional Engineers
V. E. Scott, Secretary
P. O. Box 175, Pulaski Heights Station, Little Rock, Arkansas

California State Board of Registration for Civil and Professional Engineers
W. A. White, Executive Secretary
Room 529, Business & Professions Bldg., Sacramento 14, California

Colorado State Board of Registration for Professional Engineers and Land Surveyors
M. E. Langsteiner, Asst. Secretary
20 Capitol Building, Denver, Colorado

Connecticut State Board of Registration for Professional Engineers and Land Surveyors
William K. Simpson, Secretary
30 Oak Street, Hartford 6, Connecticut

Delaware State Board of Registration for Professional Engineers and Land Surveyors
Carmen J. Facciolo, Secretary
313 Penna. Bldg., 100 S. French Street,
Wilmington 1, Delaware

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## book looks

***The Book:*** **Motivation and Morale In Industry**

***The Author:*** **Dr. Morris S. Viteles**

***The Publisher:*** **W. W. Norton & Co., New York**

***Reviewing the Book:*** **Clarence T. Shoch, Vice President, NSPE and Ass't. to the Vice Pres., Commercial Dept., Pennsylvania Light & Power Company.**

IT has been said that motivation accounts for nine-tenths of all great achievements and this statement serves well to indicate the potential value of this well-balanced book by Dr. Viteles. MOTIVATION AND MORALE IN INDUSTRY is, at one time, a treatise on the psychological factors entering into the production scheme of American industry, a text book of ways and means of achieving a maximum potential of the labor force and a reference source which encourages further study into the problems of manpower management.

Dr. Viteles leads us into the needs and wants of workers, and the ways of treating them. He recognizes that motivation and morale require the greatest possible administrative skill, involving as they do an understanding of people and of the techniques of handling them. In view of the substantial lag in a general understanding of motivation, at least when compared to the understanding we have of technical skills, we are importuned to make a quick adjustment of this shortcoming to overcome the tendency of employees to perform at only a minor fraction of their capabilities.

The book takes us through the principles of motivation and morale building, emphasizing the need for managements to believe in their workers, to set proper personal examples devoid of insincerity and hypocrisy and to participate actively in administering the motivation and morale program. Full management understanding is needed also in setting up proper incentives and rewards and in recognizing achievements appropriately. Important too, jobs must have built into them, to the maximum degree, the content necessary to satisfy a worker's own measure of his skill and proficiency. Also, the worker must have explained to him the importance of his job in relation to other jobs contributing to the same product or service.

THE value of the subject discussed comes with the realization that while modern machine methods have great capacity for producing faster, cheaper and better, it must be admitted as stark reality that the people who man these machines are, at times, the greatest deterrent to low-cost production line accomplishments. Labor cost is almost always a predominant factor in production cost. Constantly rising labor cost adds to the pinch or, literally, the squeeze already faced by manufacturers in the form of rising taxes and material costs, and sales prices fixed by competitive markets. Of all these elements mentioned as affecting the harrowed plant operator or business man, labor cost alone is susceptible to any great degree of internal control. Aside from a purely mercenary or defensive approach in labor management, the employer also owes intelligent consideration to adapting the workers psychologically to an acceptance of what at times can be a depressing, humdrum existence of day-after-day spent in repetitive work, with little opportunity for changes that appeal to imaginative minds.

The book is in five major sections. The first deals with mobilizing the will to work, pointing out that this is industry's core problem in the utilization of manpower. The capacity of a man to work is compared with his will to work. Production holdbacks are outlined, with indication that they are caused by the general indifference of labor and a "do as little as possible" attitude. It is pointed out here that the need is not just increased production—there is a considerable need also for job satisfaction. Wage incentive systems are described and compared. Morale is defined as an attitude of satisfaction, with a desire to continue in and a willingness to strive for the goals of a particular group or organization.

THE second section deals with the background of motivational theory, outlining motives, attitudes and incentives, and discourses on the impact of social psychology. Field theory and action research in group dynamics are discussed. Next is a chapter on experimental studies, evaluating the influence of job preference and the size of the work group. Relationships existing between supervision, production and morale are discussed and the effect of employee participation in decisions is pointed out. Team work in the working group is explored to a considerable degree.

Employee attitude surveys form another part of this over-all study in which are given the scope, method and guiding principles relating to such surveys. Sub-chapters deal with the employees' viewpoint of the plant situation,

## *Meet the Reviewer . . .*

NSPE Vice President Clarence T. Shoch is well-qualified as a reviewer of Dr. Viteles' book, *Motivation and Morale in Industry*, since his own career has taken him through various levels of industrial employment to his current executive-administrative post as assistant to the vice president, Commercial Department, Pennsylvania Light and Power Company.

Mr. Shoch

An electrical engineering graduate of the Drexel Institute of Technology, Mr. Shoch began his career with the power company in 1924 as an instrument man. His last assignment, before promotion to his present post, was that of industrial sales manager.

His activities as a member of NSPE and other professional and technical societies have also given him contact with many shades of thought and degrees of industrial experience that have added further insight to his comprehensive knowledge of the industrial morale picture.

Mr. Shoch is a member of Tau Beta Pi, the honorary engineering fraternity. His residence is in Allentown, Pa.

the assessment of employee morale, the importance of the pay envelope, the need for security versus immediate mercenary benefits, employees' status and recognition as affected by the quality of supervision and the attitude toward unions.

The final chapter cites guideposts for management, in which the reader is urged to find out what is on the worker's mind and to apply those findings in attitude surveys. The importance of molding and modifying employee attitude is gone into at some length and ways are suggested for accomplishing the needed changes in employee outlook. Finally, management is challenged to make substantial gains in heightening the morale and motivation of workers.

It occurred to me as I finished this very sketchy review of a volume of more than 500 pages, that Dr. Viteles had covered very well indeed the needs and solutions for increasing motivation and morale on the part of workers. Since the title of the book appears to relate to motivation and morale throughout all segments of industry, I wondered if there should not also have been a substantial chapter dealing with the motivation and morale of the employer, because in certain regrettable instances, managements have fallen into ruts which they would have the workers avoid. In these days the price of survival is full recognition, acceptance and fulfillment of all major social responsibility. To do so requires as much insight into the employer's motivation and morale as it does into that of the employee.

Despite this lack of a completely rounded treatment of the subject, MOTIVATION AND MORALE IN INDUSTRY is a valuable contribution to the knowledge of plant managers, production superintendents, group supervisors and relations counselors concerned with doing the best possible job with the work force available. Dr. Viteles has sensed correctly that his subject is the field in which most employers are least prepared to grapple with the management problems involved.—***End.***

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## *Letters*

(*Continued from page* 5)

sionals to repeat the economic facts of life to the people. We must tell them the truths of life so that they may know how to achieve happiness.

The American public is not a well educated public. It is a public with a great deal of knowledge about a great many things. It has learned plenty. This is not education. Education is a discipline of mind and character. One who is well educated has such a discipline of mind and character that he can discover truth and abide by its tenets. Education is mental and moral discipline, it is not knowledge.

The advancement of engineering may well bring to America the greatest culture the world has ever known. (Not in our time, however.) The ancient Greeks achieved the highest culture to date. Slave labor was necessary to achieve it. Engineering improvements will eventually allow man to devote the greater part of his time to culture and education. America has a great future if we face the facts not the salesman. The future of America is bound to free enterprise. This system was never in greater danger.

Mr. Randall has written that the salvation of free enterprise lies in the hands of the farmer and the worker. He says, "and one of the most revealing figures is the low percentage of officials and supervisors who buy the stocks of their companies." The New York Stock Exchange is the bulwark of free enterprise. It is now turning, not to business leaders, but, to the common man for support. It has endorsed a plan to encourage the man in the street to become an enterpriser by purchasing stock on the installment plan through his local bank. Next to religion the communist hates Wall Street the most. Wall Street, realizing that leadership is an elective office, is asking the man in the street to give it leadership. The fact is that leadership is not something you give the public. It is something the public gives you.

Let us review the facts. The American public is materialistic. It places more value upon the material things of life than upon the spiritual things of life. The American public is not educated. It prefers knowledge to mental and moral discipline. Business leadership is not given to the public. It is received from the public. Politicians and labor bosses are getting a greater share of leadership from the public than are the executives of business and industry. Business and industry must get its leadership through the success of the free enterprise system. This is impossible at present. The very citadel of free enterprise, the New York Stock Exchange, does not have the spirited support of the farmer, the worker, the managers of business and industry, or of many powerful enterprisers.

Business must do three things to obtain leadership through public recognition. It must promulgate economic truth. It must persuade the man in the street to invest in stocks and bonds. It must support the New York Stock Exchange as the medium which keeps enterprise liquid according to the law of supply and demand.

Business cannot give the public that which it does not have—namely leadership. It cannot serve the public best because it must obey the laws of the science of economics. The public now recognizes the politician as the leader. He can serve the public. The laws he obeys he can make himself. Business has actually begun to fight to win leadership in this materialistic world. The engineer and the scientist can help. They deal in facts. Facts make knowledge. The public wants knowledge, not education. Education comes after knowledge. Perhaps if the business man regains his position of leadership Aristotle will take it away from him.

PETER A. SEWARD, P. E.
Swampscott, Mass.

***Sorry . . .***

***Even with 50 pages this Special National Engineers' Week issue of the AE is not BIG enough! Space limitations ruled out our use of such popular features as the legislative report, "From Washington," and "Professional Postscripts." They will be back next month, though.***

## *Forrest*

(*Continued from page* 9)

are well-oriented to the various demands that the future will make of us.

Then we can be certain that "Engineering—Builder of a Strong America" will be something more than a slogan that is repeated and recognized for a week. We will have transformed it into the nuclear thought that all our fellow citizens will call to mind immediately when they hear mention made of this profession which is surely one of the cornerstones of the modern age.

National Engineers' Week is not only *our* week as engineers. It is an observance which all citizens—the users of engineering products and services—can truly regard as their own in some positive and definite measure. Let us work diligently, therefore, to insure its success in 1954.


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# *N.S.P.E. Believes*

# ENGINEERS' WEEK

BY PAUL H. ROBBINS, P.E.

*Executive Director*

N.S.P.E.

DURING the week of February 21-27, a great deal of the media by which information is transmitted to the public-at-large will carry stories pertaining to the contributions engineers have made to the development of our country. Plagued as we are with so many weeks recognizing this, that, or the other subject, there have been those who have viewed this activity with some apprehension. The experience of several years now, however, has shown that a week devoted to recognition of professional accomplishments has been, and can be, treated in a highly dignified and professional manner. Undoubtedly this is because the individuals who have worked so diligently in developing the activities by which the engineering profession is publicized during this Week are those individuals who are fully aware of the necessity of such recognition being on a high professional plane.

At the time this program was inaugurated, NSPE was confident that given a few simple tools, the engineers of the nation, largely through their local chapters, would conduct a program from which nothing but the highest recognition would accrue to the profession. Past Engineers' Weeks have borne out the confidence of the Society.

Engineers' Week follows very closely a basic philosophy of NSPE; namely, that the professional stature of engineering will only be the composite of that accorded the individual members of the profession. While it is true that there will be considerable national recognition of Engineers' Week through radio, television, newspaper and magazine articles, the real public relations value is the local angle given to the program in communities throughout the country.

To the friends, neighbors, and acquaintances of each engineer, their impression of the engineering profession is that gained from him. Thus, it is important that at the time we are recognizing engineers during Engineers' Week, every effort should be bent to focus the attention on the individual engineer in his local community. Recognizing that broad recognition of the engineering profession is extremely important, as exemplified by the President's message elsewhere in this issue of the AMERICAN ENGINEER, the real items of interest are those on local radio, television, and in the local newspapers pertaining to individuals known in the community, the industry and the activities of the engineering profession at home.

The ingenuity of local engineers in devising activities by which public attention can be focused on their local activities has been most effective. For example, in several of our larger cities, the merchants have each donated a large store window in which the industries of the community will display the work in which their engineers have contributed so greatly. A committee of the local engineering group will judge the best display and award a suitable citation to the winning exhibitor. In another community, flags noting Engineers' Week will fly from the standards of every bus and public transportation vehicle. In another large community, the local chapter has organized a banquet which is sponsored by the local employers of engineers—no individual engineer can buy his own ticket. Industry buys as many tickets as they see fit, sending their engineers to this banquet to rub elbows with their fellow engineers. This has a dual benefit—it offers a medium by which the employer may show in a very small way his appreciation of the professional stature of his engineering employees; and at the same time permits his employees to broaden their acquaintanceship among their professional colleagues.

Of course, the special sections that will be carried in some local newspapers outlining engineering developments in their communities, the television shows which will present to the vast listening audiences some of their outstanding engineers, the radio forums which will discuss some of the pressing community problems from an engineering standpoint—all contribute to a better understanding of the work done by the engineering profession and its importance to the everyday life of the community. But perhaps most of all, Engineers' Week provides an opportunity for Mr. and Mrs. Average Citizen to realize that their neighbors and friends who are engineers are members of a great profession contributing to their welfare. Thus, Engineers' Week carries on a basic premise of the National Society of Professional Engineers, that as the individual engineer increases in professional stature, so will the stature of the entire engineering profession be correspondingly elevated.—*End.*

# *With Our Members . . .*

***Idaho News***

## Annual Meeting in Boise Offers Many Interesting Program Features

The 1954 Annual Convention of the Idaho Society of Professional Engineers was held in Boise, January 14-16. Headquarters for the meeting, which was planned under the chairmanship of Robert E. Smith, were located at the Hotel Boise.

Panel discussions on *Engineer Retainer Contracts, Methods and Fees, Freedom of Association, Engineers' Registration Law,* and *Financing Idaho's Highway Needs* were among the program highlights. NSPE President T. Carr Forrest, Jr., was the featured speaker at the main banquet on Saturday evening; his topic was *The NSPE and You.*

The local sections of the American Institute of Mining & Metallurgical Engineers, the American Society of Civil Engineers, and the American Institute of Electrical Engineers accepted the Idaho Society's invitation to sponsor a luncheon or dinner during the three-day meeting, and the attendance of their members was welcomed. The ASCE Friday luncheon featured George N. Carter, manager of the Boise Project, U. S. Bureau of Reclamation, who spoke on *Hydraulic Fill Dams.* W. W. Staley ,professor of mining at the University of Idaho, spoke on *The Philippines, Their Mining and People,* during the Friday evening dinner sponsored by the AIMME. And Governor Len Jordan gave an address on *The Columbia Basin Inter-Agency Committee* during the AIEE-sponsored Saturday luncheon.

Idaho President Jay E. Painter presided at the several business sessions held during the convention.

### *Miami Engineer Resumes Publication*

The publication of *The Miami Engineer,* the news bulletin of the Miami Chapter, Ohio SPE, has been resumed under the editorship of E. L. Bowen.

The January meeting of the Miami Chapter featured an address by OSPE President Charles P. Smith who is also executive assistant of the Ohio Turnpike Commission. In addition, under the direction of Chapter President J. H. Stalker, plans are being worked out for a joint meeting with area technical society members during National Engineers' Week.

### *Atlanta Chapter Holds Annual Meeting*

Members of the Atlanta Chapter, Georgia SPE, held their annual meeting recently at the Piedmont Driving Club. Over one hundred persons were present for the traditional banquet.

The installation of 1954 officers was also held during the evening. The new chapter officials are: Orbie Bostick, president; Charles Lines, vice president; J. Carney, secretary; and William Cox, treasurer, Edward Klein, the outgoing president, served as toastmaster.

**Atlanta Officers**

**Pictured, left to right, above are J. Carney, Orbie Bostick, and Charles L. Lines, secretary, president, and vice president respectively of the Atlanta, Georgia, Chapter. William Cox, the new treasurer, was not present for the photo.**

### *Missouri SPE Plans Membership Drive*

National Director Joe B. Butler of Rolla, Mo., has been named chairman and E. W. Butler of St. Louis has been named vice chairman of the Missouri SPE Membership Committee for 1954. Their goal will be to boost the State Society's membership by at least 10 per cent during the year.

Chairman Butler has already won recognition for his membership recruitment activities, having been presented with a special NSPE certificate in recognition of his success during the Daytona Beach meeting of the National Society last June.

### *Texas P.E.'s Among Houston C of C Officers*

Seven of the officers and directors of the Houston Chamber of Commerce are also members of the San Jacinto Chapter, Texas SPE. Heading the list is Howard T. Tellepsen, the new C of C president, who is a past president of the engineering group. Russell Jolley, a past director of the San Jacinto Chapter, is vice president and director-at-large of the Chamber; and Herbert Allen, another vice president, is also a chapter member. Also, P. H. Robinson, new Chamber treasurer and director, is a past director of the P.E. chapter.

Other directors of the business organization who are also San Jacinto members are Mason G. Lockwood, E. A. Craft, and George Brown. Mr. Lockwood is a past president of the engineers, and Mr. Craft received the 1952 "Engineer of the Year" award from the chapter.

### *Labor Relations Talk In Albany*

Leon B. Kromer, labor relations director of the Albany Builders Exchange, spoke before the January 19th dinner meeting of the Albany County Chapter, NYSSPE. His subject was *The Contractor and His Labor Relations Problems.*

## *Wisconsin Annual Meeting Held Late In January*

January 28-30 marked the dates of the Eleventh Annual Meeting of the Wisconsin SPE, which was held at the Schroeder Hotel in Milwaukee. A varied professional and social program was provided for those in attendance, with a special program for the ladies.

Among the speakers who addressed the various sessions were: Anthony Von Werring, chairman of the finance committee, A. O. Smith Corporation; Dr. J. O. Christianson, superintendent, School of Architecture, University of Minnesota; Joseph J. Weiler, president, Wisconsin Architects Association; Morton O. Withey, dean *emeritus*, and Kurt F. Wendt, dean, College of Engineering, University of Wisconsin; and William E. Crawford, chairman, Engineering Division, Wisconsin Registration Board. Charley Grimm, manager of the Milwaukee Braves, addressed the Saturday luncheon meeting.

President Pierce G. Ellis opened the functional group meetings and also presided at other special functions. Orrin E. Andrus served as chairman of the Program Committee, assisted by Harry S. Fullwood, E. L. Hanley, George Koresh, J. R. Meyer, and R. J. Mendenhall. Mrs. George Sievers was chairman of the Ladies Program Committee, assisted by Mrs. John Andreas, Mrs. Larue Stark, and Mrs. Harry Gute.

## *Licenses Presented In New York Ceremony*

P. E. licenses were presented to 98 New York engineers during ceremonies held recently in the Georgian Room of the Hotel Statler, New York City. The event was sponsored by the metropolitan chapters of the NYSSPE —Richmond, Rockland, Westchester, Kings, New York, Queens; Nassau, and Bronx—and the local sections of the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Society of Civil Engineers.

The licenses were presented to the new engineers by Newell Freeman, secretary of the New York State Board of Examiners. William Larkin, chairman of the Board, addressed the candidates on the significance of the license and the responsibilities involved. Other speakers for the occasion were Philip Rutledge, vice president of the metropolitan section of the ASCE, and Carl Gilt, NYSSPE president, who was chairman of the ceremony.

## *St. Clair (Ill.) Chapter Celebrates 25th Birthday*

The silver anniversary of the organization of the St. Clair Chapter, Illinois SPE, was celebrated recently with a dinner dance at the Elks Club in Belleville. During the dinner, State President Raymond Brichler introduced the 1954 officers of the St. Clair group. They include: Arthur Frichert, president; Loren Krause, vice president; Manuel Garcia, secretary-treasurer; and L. J. Keenan, chapter representative.

A St. Clair Chapter banner, which had been made by Mrs. Brichler, was also presented during the evening by Mrs. D. J. Johnston, president of the Ladies' Auxiliary.

Ross Shannon of Socony-Vacuum Oil Company, Inc., was guest speaker, and the guest list included many distinguished names including East St. Louis Commissioners Robert Keeley and Leonard Reinhardt.

Members of the chapter are now making plans to serve as hosts for the sixty-ninth annual meeting of the ISPE which will be held at the Broadview Hotel, East St. Louis, Ill., March 25-27.

## *Coleman Addresses Mahoning Valley P.E.'s*

The January 5th meeting of the Mahoning Valley Society of Professional Engineers, Ohio SPE, featured an address by John D. Coleman, the immediate past president of NSPE. The meeting was held at Club 442 near Warren, O.

## *Textile Executive Addresses S. C. P.E.'s*

Charles A. Gibson, prominent South Carolina textile executive and a former president of the South Carolina Textile Manufacturers' Association, addressed a recent meeting of the Piedmont Chapter, South Carolina SPE. Mr. Gibson's lecture dealt with the role of industry in the state's progress with emphasis on the professional engineers' responsibility for the future.

The meeting was held at the Ottaray Hotel in Greenville, S. C., and the Hon. Robert T. Ashmore, Congressman from the Fourth District, attended as a guest of the chapter.

## *Memorial Honors Benjamin Kaplan*

Theater Number 1 at Fort Monmouth, N. J., has recently been renamed the Kaplan Memorial Theater in special dedication ceremonies at the military post. The new designation honors the memory of the late Major Benjamin Kaplan, former post engineer and a past president of the Monmouth-Ocean Chapter of the New Jersey SPE.

Kaplan, who died on September 15, 1952, served at Fort Monmouth in both civilian and military engineering capacities. In 1933 he supervised the construction of the recently rededicated theater, which now carries a memorial plaque in his honor.

***. . . more news on page 45***

**At New York License Presentation**

**Above, Carl Gilt, NYSSPE president, speaks during a recent license presentation ceremony in New York (see story at left). Also shown, l. to r., are: James Fairman, N. Y. State Board member and former NSPE vice president; Leland Stone, president, New York Section, AIEE; William Larkin, examining board chairman; Mr. Gilt; Philip Rutledge, vice president, Metropolitan Section, ASCE; Allen Kniffen, sec'y, Metropolitan Section, ASME; and Newell Freeman, sec'y, N. Y. State Board.**

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*Directory Continued on Next Page . . .*

## With the Ladies

**By MRS. FRANK W. CHAPPELL**
***Chairman, NSPE Ladies Advisory Committee***

Members of the Ladies' Auxiliary to the Tulsa Chapter, Oklahoma SPE, joined forces with chapter members for the Annual Dinner held January 8th at the Oakes Country Club. Mrs. M. P. Ragan was chairman in charge of the event, assisted by co-chairmen Mrs. F. Foley Wright and Mrs. J. R. Wright.

Under the chairmanship of Mrs. Percy F. Blair, the members have also been working on plans for the ladies' program in connection with the State Society convention to be held in Tulsa, February 26-27.

In addition, Mrs. J. L. Vint, Jr., auxiliary membership chairman, has reported that 33 new members have joined the group.

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Recently elected officers of the Ladies' Auxiliary to the Midwestern Chapter, Pennsylvania SPE, are: Mrs. H. S. Reizenstein, Jr., president; Mrs. R. E. Britton, first vice president; Mrs. A. T. Eccles, second vice president; Mrs. T. C. North, third vice president; Mrs. H. F. Barson, recording secretary; Mrs. W. E. Wrenn, corresponding secretary; and Mrs. C. G. Avery, treasurer.

## *18th Annual Banquet Held In Cleveland*

Members of the Cleveland Society of Professional Engineers held their 18th Annual Banquet on January 22nd at the Hotel Carter. The Honorable Frances P. Bolton, Representative to Congress from Ohio's 22nd District, was the guest speaker, her address being entitled *Why Not Be Practical In World Relations?*

Warren H. Chase, assistant vice president of the Ohio Bell Telephone Co., and a member of the chapter, served as toastmaster.

Service awards for 1953 were announced by James E. Atchison, outgoing president. And the meeting also featured the installation of the 1954 slate of officers headed by Leon D. Cleverly.

***P.E. PUBLICITY CHAIRMEN***

***YOU have a date for FEBRUARY 28th!***

**That's the time to send your Engineers' Week story to the *American Engineer*.**

**As usual, space will be limited but we will give as wide coverage as possible. So get the news of the week's outstanding events in the mail EARLY.**

***FEBRUARY 28th is the day to do it!***

## *Pa. Social Notes*

Members of the Northeast Chapter, PSPE, held their Fifth Ladies' Night party at the Fox Hill Country Club, West Pittston, on January 27. Don H. Smith was chairman of the Program Committee arranging the event. Other committeemen included E. Turnbull, A. E. Ross, J. T. Griffith, J. C. Earl, W. E. Harding, R. J. Wilson, and A. E. Peters.

Another social event of note was the midwinter party of the Erie Chapter, which was arranged largely through the efforts of the new Ladies' Auxiliary. Mrs. L. B. Utterback, Mrs. A. R. Davidson, Mrs. Hugh M. Nelson, Mrs. Stanley Dockstader, Mrs. G. A. Danielson, Mrs. Robert Painter, and Mrs. Henry Cloyd constituted the committee in charge of arrangements. Chapter President Herbert Mallick presided at the banquet.

***. . . more news on page 47***

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Engineers and Chemists

Concrete — Soils — Asphalt
Inspection — Tests — Supervision
Consultation — Specifications and Investigation of
Engineering Works and Materials

1810 North 12th St. — Toledo 2, Ohio

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**WARNER ENGINEERING CO.**

Consultation—Design—Detail

Steel Mill and Heavy Industrial Construction
Mechanical—Structural—Piping

Broadway Building — Lorain, Ohio

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**OKLAHOMA TESTING LABORATORIES**

Registered Engineers—Chemists
Oklahoma City, Okla.

Materials Testing and Inspection

Member A. C. C. L.

C. A. Lashbrook, Owner-Director — M. A. Witte, Chief Engineer

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**AUBURN & ASSOCIATES, INC.**

Heavy Industrial Electrical, Foundation and Piping

Atomic Energy Work and Electrical Control Schemes

923 Penn Avenue — Pittsburgh 22, Pa.

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**CAPITOL ENGINEERING CORPORATION**

Engineers—Constructors—Management

Design and Surveys — Roads and Streets
Sewer Systems — Water Works
Planning — Airports
Bridges — Turnpikes — Dams

Executive Offices: Dillsburg, Pennsylvania
Washington, D. C. — Pittsburgh, Pa.
Dallas, Texas — Paris, France

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**FRAZIER-SIMPLEX, INC.**

CONTRACTING & CONSULTING ENGINEERS

Furnace Engineering for the Glass and Steel Industries

436 East Beau Street, WASHINGTON, PA.
U. S. A.

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**GANNETT FLEMING CORDDRY & CARPENTER, INC.**

Engineers

Water, Sewage, Roads, Turnpikes,
Bridges, Airports, Traffic, Appraisals

HARRISBURG, PA.

Philadelphia, Pa. — Daytona Beach, Fla.
Pittsburgh, Pa. — Medellin, Colombia, S. A.

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**LAWRIE & GREEN & ASSOCIATES**

Architectural and Engineering Offices

321 N. Front Street
Harrisburg, Pennsylvania

Ritchie Lawrie, Jr., P.E., Consulting Engineer

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**LOEDDING ENGINEERING CO., INC.**

*Consulting, Design and Detail*

Industrial and Commercial Planning
Bridges, Structures of all Types
Material Handling
Conveyors, Gantry, Overhead and Jib Cranes
Reinforced Concrete and Foundations
Industrial Piping and Ventilation

Economy Bank Building, Ambridge, Penna.

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*. . . Restricted to Registered Professional Engineers*

# Professional Directory

*Alphabetically Arranged by States* . . . *Pennsylvania-W. Va.*

**MODJESKI AND MASTERS**
Consulting Engineers

G. H. Randall, C. W. Hanson, F. M. Masters, J. R. Giese, H. J. Engel

Design and Supervision of Construction
Inspection and Reports
Bridges, Structures and Foundations

State St. Bldg., Harrisburg, Pa. — New Orleans, La. Philadelphia, Pa.

**CYRUS WM. RICE & CO., INC.**

Consulting Chemical Engineers
Industrial Water and Waste

16 Noble Avenue, Pittsburgh 5, Penna.

**EMERSON VENABLE**
Chemist and Chemical Engineer

Chemical Analysis
Research — Development
Trouble Shooting

6111 Fifth Ave., Pittsburgh 32, Pa.

**YOKLEY and WAGGONER**
Consulting Engineers

Airports, Roads, Sewerage, Structures,
Soil Mechanics, Design, Supervision,
Surveys

1123 Church Street — Nashville 3, Tennessee

**CORMIT ENGINEERING COMPANY**
Marshall E. Parker, P.E.

CORROSION — CATHODIC PROTECTION
Surveys, Reports, Design, Specifications
Coating Inspection
UNDERGROUND PIPING, WATER TANKS, OFFSHORE PLATFORMS, BARGES, PILING

M & M Building
No. 1 Main Street, Houston 2, Texas
Telephone FAirfax 9953

**THOMAS E. DUCE ASSOCIATES**
Consulting Engineers

Electrical and Mechanical

Murray Building
1733 S. Brownlee Blvd., Corpus Christi, Tex.

**ENGINEERS TESTING LABORATORY, INC.**

FOUNDATION AND
SOIL MECHANICS INVESTIGATIONS

Soil Borings — Laboratory Tests
Foundation Analyses — Reports

3313 Main Street — Houston, Texas

**FORREST and COTTON**
CONSULTING ENGINEERS

Regional Water Supplies
Water and Sewage Works
Industrial Development
Airports — Dams
Appraisals — Reports

803 Praetorian Building — Dallas 1, Texas

**JAMES H. HOWARD & ASSOCIATES**
Consulting Engineers

Air Conditioning, Heating & Ventilating
Mechanical & Electrical
Plans and Specifications

4101 San Jacinto St., Houston 4, Texas

**LLOYD N. ROBINSON, Fel. AIEE**
Consulting Engineer

Registered in N. Y., Washington & Alaska
ELECTRIC POWER
Generation, Transmission, Distribution and Applications

Stuart Building — Seattle 1, Wash.

**ROBERT C. LAFFERTY**
Consulting Geologist and Engineer
OIL and GAS

Appraisals, Exploration, Development, Management

Union Building, Charleston, W. Va. — Phones 6-4243, 5-2461

*. . Supplemental Services . .*

**EHRCO DIE CASTING SERVICE**

Engineering Consultation—Die Castings
Equipment—Installation
Die and Product Design

John R. Ehrbar, P.E., Pres.
303 Main Street, Stamford, Connecticut
Telephone 3-2308

**BUILDERS ESTIMATING SERVICE**

COST ESTIMATES
QUANTITY SURVEYS
CONSTRUCTION ANALYSIS
MATERIAL PURCHASE LISTS

140 Nassau Street, New York 38, N. Y. — Telephone Beekman 3-0883

**EASTERN HEAT TREATING & BRAZING CORP.**

Precision Heat Treatment and Brazing
Induction Heat — Heli-Arc-Welding
Hydrogen Atmospheric Cycles
Affiliated Company:—
EASTERN METALS INDUSTRIES, INC.
Metallic Bellows Assemblies

250 West 54 Street, New York 19, N. Y.
Joseph Lipset, P.E., Pres.

**POTTEIGER COMPANY INC.**

Builders for Engineers

328 Tulpehocken Ave., West Reading, Pa.

## *Klassen On World Tour*

Clarence Klassen, chief sanitary engineer for the State of Illinois and a member of the Capital Chapter, ISPE, has been on a world tour recently on an assignment to help implement the United Nations' program for furnishing technical advice on world health matters. The tour was scheduled to cover Hawaii, Guam, the Philippines, Borneo, Formosa, India, Siam, Pakistan, Israel, and Italy before Mr. Klassen reported his findings to World Health Headquarters at Geneva, Switzerland.

## *Golden Gate P.E.'s Hear Legislative Talk*

The January 20th meeting of the Golden Gate Chapter, California SPE, featured a talk by William F. Collins, chairman of the CSPE Legislative Committee. Mr. Collins, who is both a lawyer and a mechanical engineer, spoke on *The Legislative Situation, Past, Present and Future.*

## *West Virginia Officers*

New officers who have recently taken over the direction of the West Virginia Society of Professional Engineers for 1954 are: George W. McAlpin, East Charleston, president; Paul M. Hutchinson, Clarksburg, first vice president; R. C. Bundy, Parkersburg, second vice president; and H. J. Wagner, Charleston, treasurer.

## *J. D. Swafford Dies*

James Donald Swafford, a well-known member of the Illinois Society of Professional Engineers and NSPE, died unexpectedly recently in Forest Park, Ill. He was a registered engineer in Kansas and Missouri, as well as in Illinois, and had also been a member of the KSPE and MSPE.

Mr. Swafford was an electrical engineering graduate of the University of Kansas. At the time of his death he was working with the Delta-Star Electric Company, a division of H. K. Porter Company, Inc., in Chicago.

LEGAL NOTICE
STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233).

Of American Engineer published monthly at Baltimore, Maryland, for December, 1953.

1. The names and addresses of the publisher and editor are: Publisher, National Society of Professional Engineers, 1121 15th St. N. W., Washington, D. C.; Editor, Kenneth E. Trombley, 1121 15th St. N. W., Wash., D. C.

2. The owner is: National Society of Professional Engineers, 1121 15th Street, N. W., Wash., D. C.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relations, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semi-weekly, and tri-weekly newspapers only.)

KENNETH E. TROMBLEY, Editor

Sworn to and subscribed before me this 3rd day of September, 1953.

(SEAL) MILTON F. LUNCH

(My commission expires September 14, 1957)

***Read the American Engineer every month.***

## Incentives

(*Continued from page 23*)

industrial tractors, industrial equipment, motor trucks and military projects are recognized as essential. Our only questionable products are refrigeration units which are rapidly reaching consideration as essential for the health and welfare of the nation."

In its reply, Alcoa provided a very telling definition of essentiality that seemed to summarize the general attitude and parallel the general situation in many other fields as well. "We have," the company reported, "rated Essential Industry in the third position, as we interpret this factor to mean a necessary and growing industry within the economy. Most young men realize today that Alcoa plays a vital part in wartime, and they are apparently aware of the many civilian uses for aluminum. In other words, the aluminum industry is an essential one under normal and abnormal conditions."

### Profit Sharing Plans

The existence and recognition of the fifth incentive determined by the Professional Engineers Conference Board —profit sharing plans—is far from universal in American industry today. The majority of firms replying to the AMERICAN ENGINEER either indicated that they had no such plans or else did not comment at all, thus evidencing the absence of this particular incentive. A few firms used such phrases as "non-existent at present" or "not presently a part of company policy," which might be interpreted to indicate a possibility of their introduction in the future.

A number of firms reported the existence of bonus plans in lieu of profit sharing, and one company mentioned that it makes special financial awards for unusual ideas that prove profitable.

Pittsburgh Plate Glass explained that, while there was no company-wide policy, some divisions offered various profit sharing features including the stock-option plan. Voluntary stock-purchase plans to which both the company and the employee contribute were also reported by Sun Oil and Standard Oil of California. Another member of the petroleum group—Standard of New Jersey—may, "depending on the business outlook and company earnings," authorize an additional contribution to the employees' thrift funds, the participation in the thrift plan being entirely voluntary on the part of employees. Affiliate companies may also individually adopt this scheme for their own employees who subscribe to the thrift plan.

Fairchild Aircraft replied that at the end of the first year and each year thereafter, salaried personnel of the Fairchild Corporation receive a proportionate share of company profits for that year; then, after the completion of five years of continuous service, they become eligible for life insurance and fixed pension benefits.

Raytheon engineers, that electronics company reported, participate in profits upon retirement (although pension arrangements, strictly speaking, are more properly regarded as benefits). In addition to the employees' share, company contributions to the retirement fund are made from profits before taxes under a system that provides for a more liberal retirement than would be possible under the average joint contributory plan. Another firm stated that, while there was no profit sharing, every effort was made to see that individual value was recognized within its salary structure.

On the whole, however, the profit sharing incentive rated the least interest as far as management comments were concerned.

### The General View

Industry is reaching out for the engineer, and especially for the young man. From the replies that the AMERICAN ENGINEER received, it is easy to see that management feels a definite responsibility to give the engineer the best possible environment in which to work and to develop his capabilities. The companies are confident about the future and highly optimistic about the number and variety of positions that they will have available for the talented engineer, both in the technical field itself and in the administrative fields where an engineering background is important.

SOME notes of caution were sounded. In the Standard Oil of California career brochure, for example, it was precisely stated that: "It would be unfair, however, for us to make blanket promises of rapid progress within our company. Basically, as elsewhere in this world, it depends upon the man. . . ." And that seems to be the general feeling in the other firms—that the jobs, the opportunities, and the challenges are there for the men who can measure up to them.

The fact that, after a number of years of employment, some engineers come to feel that perhaps the incentives are not so bright, or that their progress has bogged down for no really legitimate cause, is not within the purview of this article. The problem of job dissatisfaction is dealt with in another feature in this issue of the AMERICAN ENGINEER—"How To Attract and Hold Engineering Talent," a condensation of a new Conference Board Report. (See page 11.)

Industry is undoubtedly making a major effort to meet the desires of its engineering employees because its own future, of course, depends ultimately on how well they use the opportunities provided and meet the challenges of modern technology. Approached with this attitude, there should be no on-the-job problem beyond solution.—*End.*

# Strictly Business

***Personalities . . .*** The board of directors of KENSINGTON STEEL COMPANY, Chicago, has announced the election of EUGENE C. BAUER, JR., as president and H. MONTEITH ALBERS as vice president. . . . GERARD T. SHANNON of Closter, N. J., has been appointed managing engineer for the Industrial Engineering Department of WALTER KIDDE CONSTRUCTORS, INC. of New York and Houston. . . . CLARENCE E. KILLEBREW has been elected vice president of CLARK EQUIPMENT COMPANY, Buchanan, Mich. . . . JOSEPH PONTE of Media, Pa., has joined the staff of the Research Center, BURROUGHS CORPORATION, Philadelphia, as a design engineer. . . . GEORGE A. BRYANT, president and general manager of THE AUSTIN COMPANY, Cleveland engineers and builders, has anounced the following administrative changes: HAROLD A. ANDERSON has been elected vice president and assistant general manager; ALLAN S. AUSTIN has been elected vice president and general sales manager; W. G. PATON continues as a vice president and has also been elected secretary; and JOHN N. BECKLEY has been named Eastern District manager. . . . ARTHUR SCHROEDER has been named southeastern application engineer with headquarters in Brookhaven, Ga., for the WARNER ELECTRIC BRAKE & CLUTCH COMPANY, Beloit, Wis.

Mr. Bauer

Mr. Maxwell

N. M. FLOYD has assumed the management of the STONE & WEBSTER ENGINEERING CORPORATION'S San Francisco office, following the retirement of vice president CHARLES A. BIGELOW; and W. L. SHEETS has been named general superintendent of the Western Area and has also become manager of the Los Angeles office. . . . F. P. MAXWELL has accepted the newly-created position of vice president of ROCKWELL MANUFACTURING COMPANY'S Power Tool Division in Pittsburgh. . . . JOHN E. TOM has been appointed director of engineering for the AMERICAN TRACTOR CORPORATION, Churubusco, Ind. . . . CHARLES A. JOHNSON has been named to a new post as assistant director of research and development for ATLAS PLYWOOD CORPORATION, Boston. . . . MARTIN J. CASERIO has been promoted to chief engineer, Automotive Products, in the AC Spark Plug Division of GENERAL MOTORS CORPORATION, according to an announcement by JOSEPH A. ANDERSON, division manager.

Gen. Bragdon

D. J. C. COPPS has been elected a vice president of ATLAS POWDER COMPANY, Wilmington, Del., to be in charge of the explosives, industrial finishes and engineering departments. . . . MAJ. GEN. J. STEWART BRAGDON, USA, Ret., has become a vice president of VERMILYA-BROWN COMPANY, INC., nationally known builders. . . . SAMUEL R. HURSH is the new chief engineer of the PENNSYLVANIA RAILROAD. . . . KERMIT D. COLLOM and STANLEY E. JACKE have joined the staff of the new Ultrasonics Division of the DETREX CORPORATION of Detroit. . . . OSBORNE BEZANSON has become chairman of the board of THE CHEMSTRAND CORPORATION, Decatur, Ala., and has been succeeded as president by HENRY H. BITLER. . . . LLOYD K. DAVIS has been promoted to superintendent of manufacture for AMERICAN CAN COMPANY'S Pacific Division. . . . HERBERT A. LONG is now chief engineer for PITTSBURGH STEEL COMPANY. . . .WILLIAM H. GATES has been named manager of the Southwest District of MINE SAFETY APPLIANCES COMPANY with headquarters in Tulsa. . . . ROBERT E. TANNER has been elected vice president and general manager of CARVER PUMP COMPANY, Muscatine, Iowa.

►

***Operational Expansion . . .*** The EMERSON RADIO AND PHONOGRAPH CORPORATION has established a new division, THE EMERSON RESEARCH LABORATORIES, in Washington, D. C. . . . Formation of INTERNATIONAL TESTING SERVICE, a division of JACKSON AND CHURCH CO., Saginaw, Mich., to provide engineering services to firms facing problems in testing instrumentation and related fields of research and development has been announced by CLIFFORD W. STUART, president of the parent company. DR. PERRY M. BANTA is director and HOMER W. PARKER is manager of the new division. . . . ARTHUR D. LITTLE, INC. of Cambridge, Mass., is opening a western regional office in San Francisco. CHRISTIAN J. MATTHEW will be in charge with RICHARD NEWHALL as an associate. . . . A new eastern division office is being established in Baltimore, Maryland, by the AMERICAN BITUMULS AND ASPHALT COMPANY. The office will be headed by L. P. STREET, vice president in charge of eastern marketing.

SEIBERLING RUBBER CO., Akron, O., has announced the organization of a new plastics division that is already in production on a pilot plant basis. The division will occupy a new plant to be built at Newcomerstown, O. . . . TOWMOTOR CORPORATION, Cleveland, O., has signed a contract with BRODRENE VESTERGAARD of Copenhagen, Denmark, which will give it production and distribution facilities in the Scandinavian countries and continental Europe, according to C. E. Smith, Towmotor president. . . . The office of A. CARL STELLING, Site Planning Consultants of New York, has announced the opening of a new branch office in New Haven, Conn., with EVERETT H. LORD-WOOD as Connecticut representative. . . . The ROCKWELL MANUFACTURING COMPANY is building a 25,000-square foot addition at its Norwalk, O., plant to house the production of its smaller balanced valve gas regulators, C. O. NALEY, general manager of the Regulator Division, has announced. . . . The KOEHRING COMPANY'S first Japanese-made 205 excavator has recently come off the assembly line, at the new ISHIKAWAJIMA-KOEHRING, LTD., plant in Yokohama, according to an announcement by the Milwaukee firm.

►

***Contract Awards . . .*** NORTH AMERICAN AVIATION, INC., Los Angeles, Cal., has been awarded a contract by the U. S. NAVY for the production of an undisclosed number of FJ-4 carrier-based jet fighter planes. . . . BROWN AND ROOT, INC., engineers and constructors of Houston, Tex., hold the general contract for the construction of a new plant of THE NATIONAL SUPPLY CO. at Gainesville, Tex.

# What's New

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1121 FIFTEENTH ST., N.W., WASHINGTON 5, D. C.

Please send information on Item 1 to:

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## OTT PRECISION PANTOGRAPH — Item 1

For reproducing exactly to an equal scale, reduced scale, increased scale, is now available from Geo-Optic Co., Inc. Has the following advantages: Pole may be inside or outside of parallelogram. Exact millimeter division for accurate setting. Well illuminated range of vision of interchangeable tracing lenses. Folds compact into case. Can be used on inclined or horizontal drawing board. Length of bars: 19.7". Accuracy of reproduction in all ratios: plus or minus 0.15 mm.

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## AREA VOLUME CALCULATOR — Item 2

Introduced as a unique time-saver is the new "Morton's Area and Volume Calculator." Operating like a slide rule, but reading like a table, this pocket style calculator gives areas or volumes to the nearest square foot. As a result, the user can obtain instantly and accurately the areas of walls, ceilings, floors and windows. In addition, the device reduces to a fraction the time required in determining the cubic footage (volume) of a room. Five different scales appearing along the edges make the calculator additionally useful. It measures 3¾ by 9 inches in size and is of lifetime vinyl plastic.

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## CONTROL VALVE SERIES — Item 3

The Parker Appliance Company has added a new complete series of directional control valves for mobile equipment to its line of hydraulic system components.

A new concept in spool slot design places the new valve series in the ultra-smooth operating class. The spool groove on the new valve is coined straight down in a V-slot permitting accurate control and smooth metering action. There is full metering in all spool porting.

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## ENAMELED STEEL ROOFING — Item 4

A new, improved enameled steel roofing and siding material called V-CORR, specially suited for industrial building construction and repair, has been put on the market by The Toledo Porcelain Enamel Products Company, a subsidiary of The Bettinger Corporation.

V-CORR is made from a corrugated steel base to which porcelain enamel has been fused at 1550 degrees F. Sold in sheet squares of 100 square feet, V-CORR is available in a range of different gauge steels, from 18 to 24 gauge.

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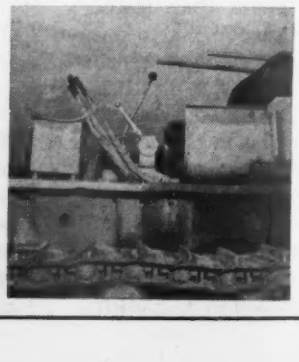
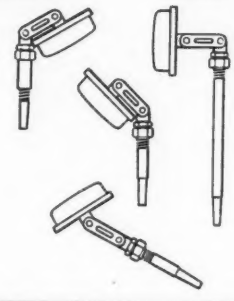
## NEW THROTTLE CONTROL — Item 5



Introduction of a new positive-action friction-type throttle control designed to improve the performance of gasoline and diesel-powered equipment has been announced by the Link-Belt Speeder Corporation. It provides an infinite range of engine speeds, can be used on shovels and other construction machinery, industrial and farm tractors, marine engines, crushers and drilling rigs, and similar equipment according to the manufacturer. Easily mounted. Holds engine speed constant.

**This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.**

## MERCURY ACTUATED THERMOMETERS — *Item 6*



Palmer Thermometers, Inc., announces a Mercury Actuated Dial Thermometer with a full 4½ inch dial face. The stem can be placed at any angle and face can be rotated to any readable position. Fully compensated for ambient temperatures. Dust and vapor proof. Accuracy guaranteed to one-scale division.

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## ELECTROSTATIC AIR CLEANER — *Item 7*

A new ceiling-suspended model of the home Precipitron electrostatic air cleaner has been announced by the Westinghouse Electric Corporation. The average-sized home model, PH-122, is designed for simple installation in the main return air duct of a forced-air heating system.

The Precipitron is the Westinghouse-developed electronic device that removes 90 percent of all airborne dust and pollen. The unit is effective even against tobacco smoke particles which are as small as 1/250,000th of an inch in diameter.

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Company .....
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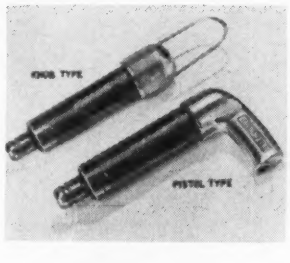
## CALDWELL HAMMERS (PNEUMATIC) — *Item 8*

The Burgess Thomas Company, national distributors for Caldwell Hammers, announces this exceptional air tool for drilling, chipping, trimming, scaling, sealing and all around general applications.

Small in size measuring 9¾" in overall length with a 1⅝" barrel diameter, approximately 5 lbs. Two handle styles, pistol type and knob type. The Caldwell is automatic in that it operates when pressed into contact with the work and stops when withdrawn.

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## MECHANICAL DUST COLLECTOR — *Item 9*

A new mechanical dust collector, the Banister DUSTMASTER, announced by A. W. Banister Co., Inc., separates dust from the air by means of centrifugal force. It has application in industrial plants for removing nuisance, toxic and hazardous dust, also for collecting valuable materials from dust, or as a pre-cleaner for filters and electric precipitators. Standard sizes from 18" to 84", diameter of body. Single, duplex, quadruplicate, and two-stage arrangements. They can be operated either under suction or pressure.

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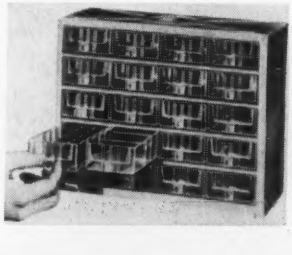
## PLASTIC DRAWER CABINETS — *Item 10*

General Industrial Co. announces the "See-Thru" drawer cabinets for small-parts filing and storage in factories, offices and school shops, home workshops and garages. Model J-20 consists of twenty crystal-clear lifetime-guaranteed plastic spillproof drawers, 5⅞"L x 2¾"W x 1-7/16"H, in a welded all-steel cabinet. Overall size is 10¼"H x 12½"W x 6"D. Cabinet has silver-gray hammer finish and is equipped with rubber feet. Adjustable drawer dividers and identification labels are included.



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# He measures millionth-inch mountains

## *—to make GM cars a better buy*

THERE are many reasons why you get more for your money in any General Motors car you buy—whether it be a Chevrolet, Pontiac, Oldsmobile, Buick or Cadillac.

Take engines, for example. Long life depends upon perfect matching of their moving parts. Yet smooth as these highly machined surfaces may feel, they are actually ridged with microscopic peaks and valleys as infinitesimal as one-millionth of an inch.

So here you see how GM insures a more perfect match. This production man is using a high-precision electronic instrument called a Surfagage®, developed by GM Research to measure the exact degree of roughness in crankshafts, pistons, bearings, cylinder walls and other wearing surfaces.

With this unique instrument laboratory-accurate measurements of surface roughness can be made instantly, right on the production line. It gives engineers in every GM production or assembly plant a split-hair check on parts' surfaces, insuring perfect matching.

In the making of every GM car there are literally hundreds of super-precision tests like this on transmissions, bodies and frames, as well as engines, which insure longer wear and smoother performance. That is one of the big reasons why the key to a General Motors car is your key to greater value.

# GENERAL MOTORS

*"Your Key to Greater Value—the Key to a General Motors Car"*

CHEVROLET • PONTIAC • OLDSMOBILE • BUICK • CADILLAC • *All with Body by Fisher* • GMC TRUCK & COACH